



( , ) Arc GIS

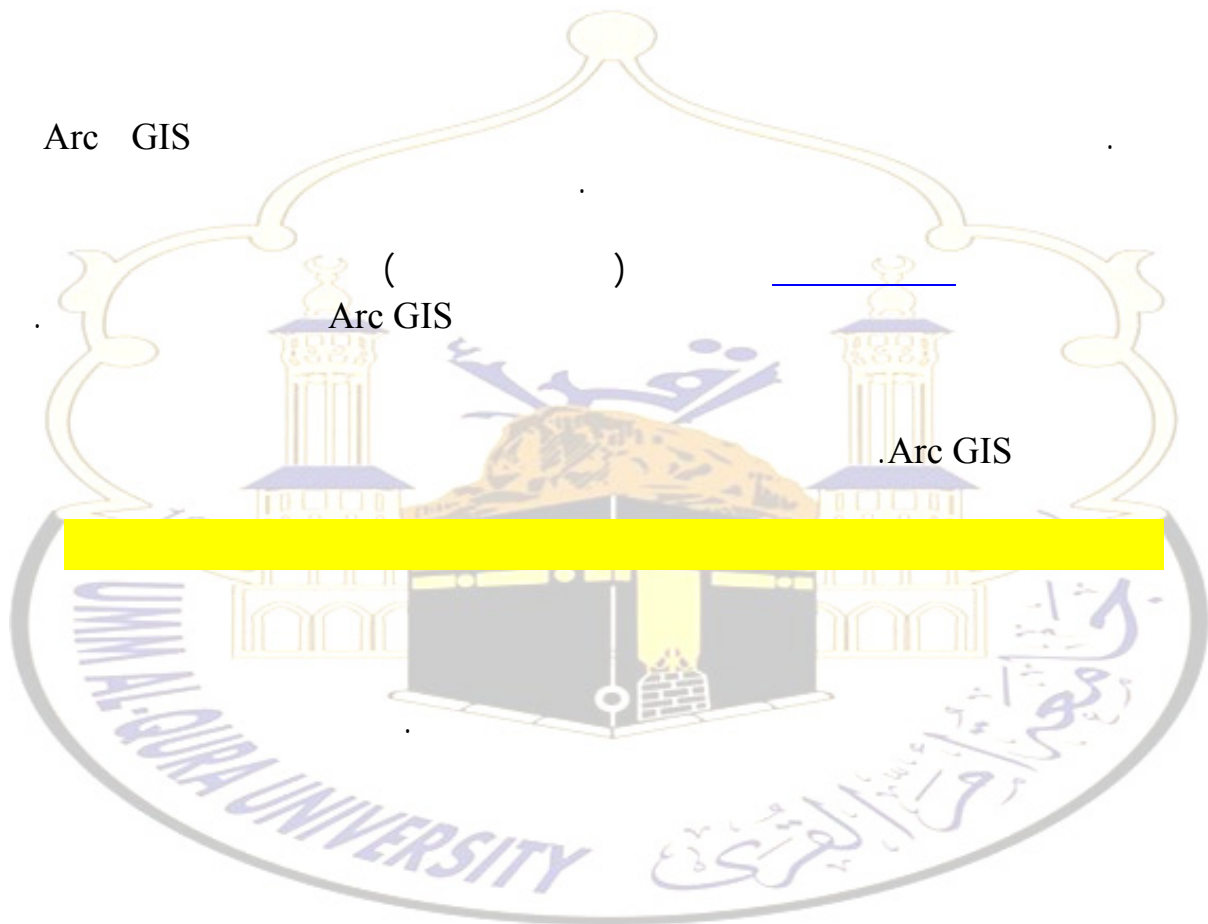
# Statistical and Spatial Analysis by ArcGIS 9.2

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## Statistical and Spatial Analysis

Arc GIS

Arc GIS



[dawod\\_gomaa@yahoo.com](mailto:dawod_gomaa@yahoo.com)

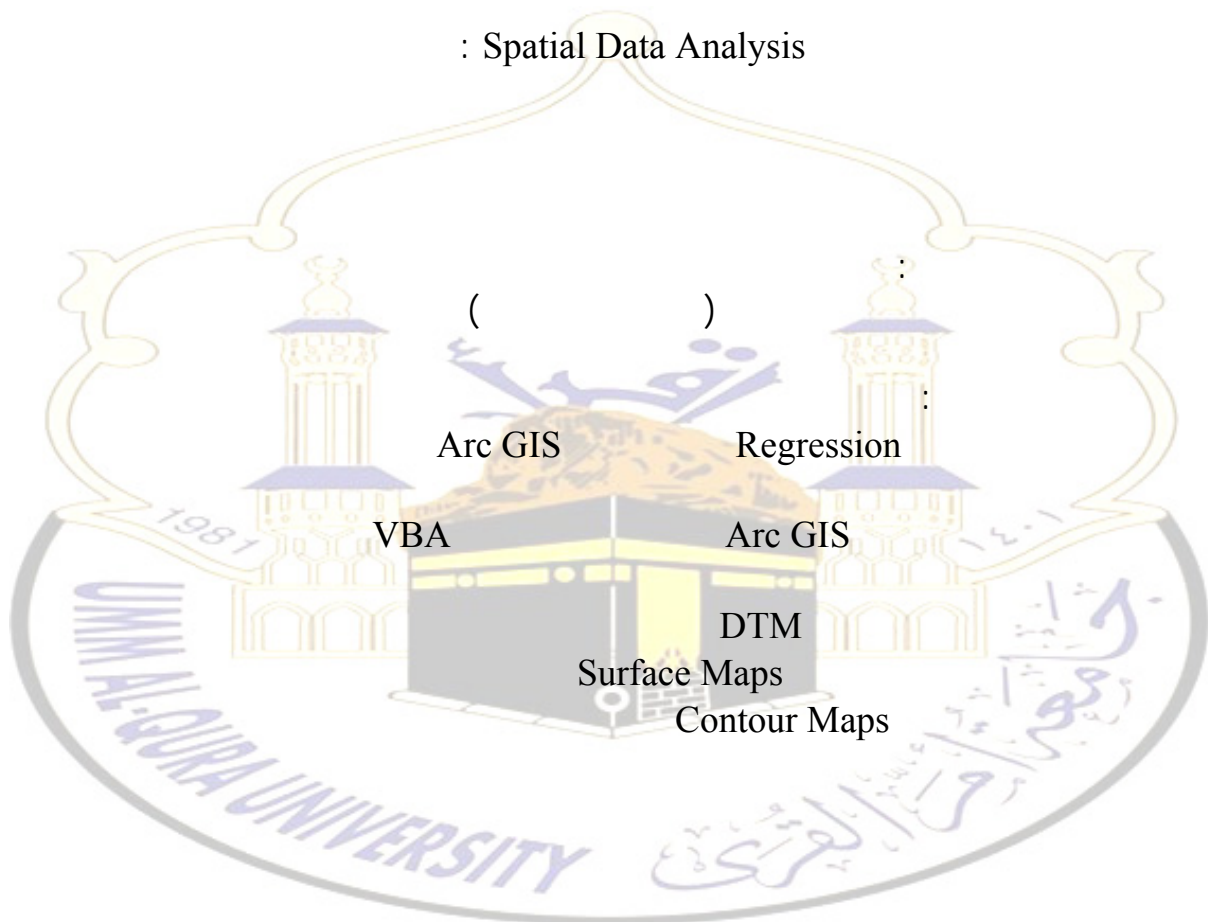
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: Attribute Data Analysis

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: Spatial Data Analysis



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## Attribute Data

### Central Tendency Measures

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**Mean** \_\_\_\_\_

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**Median** \_\_\_\_\_

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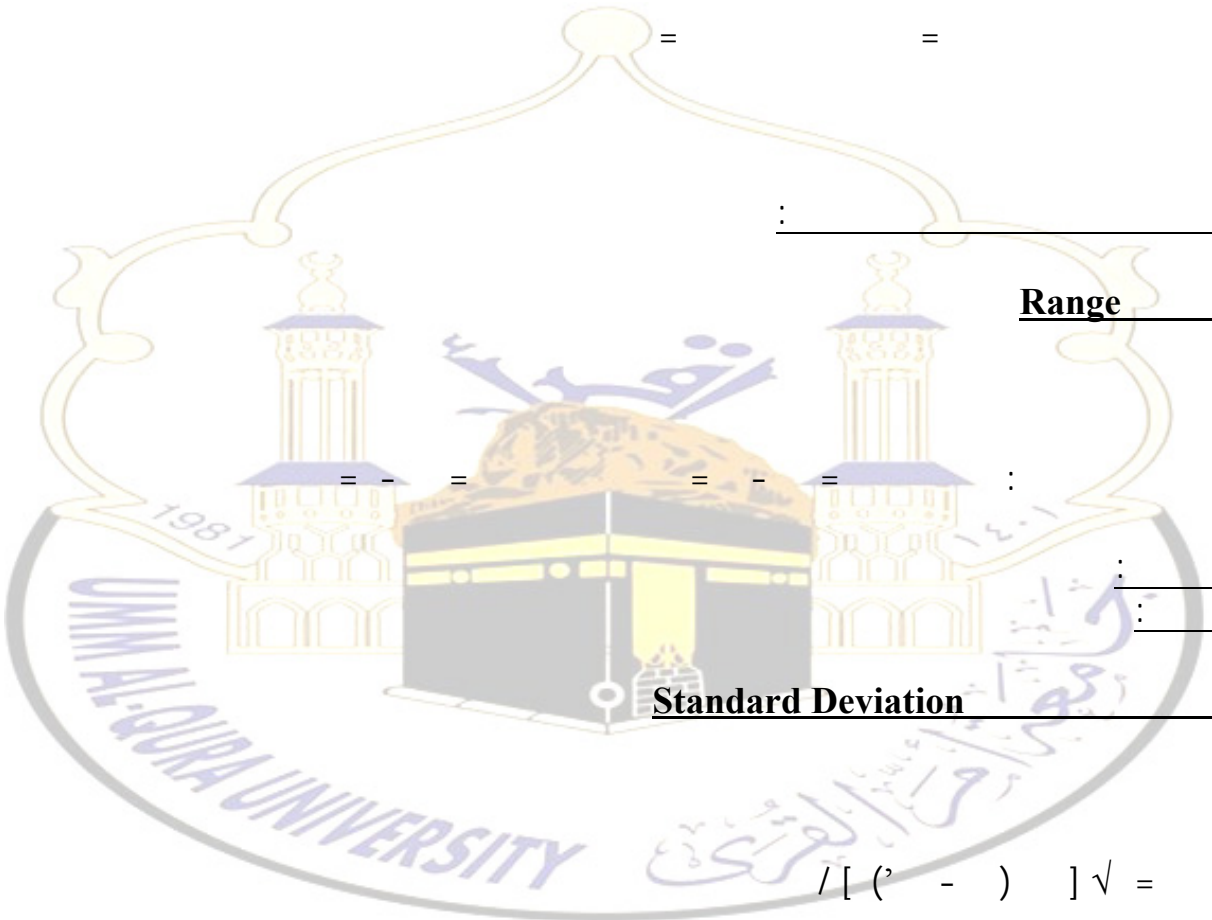
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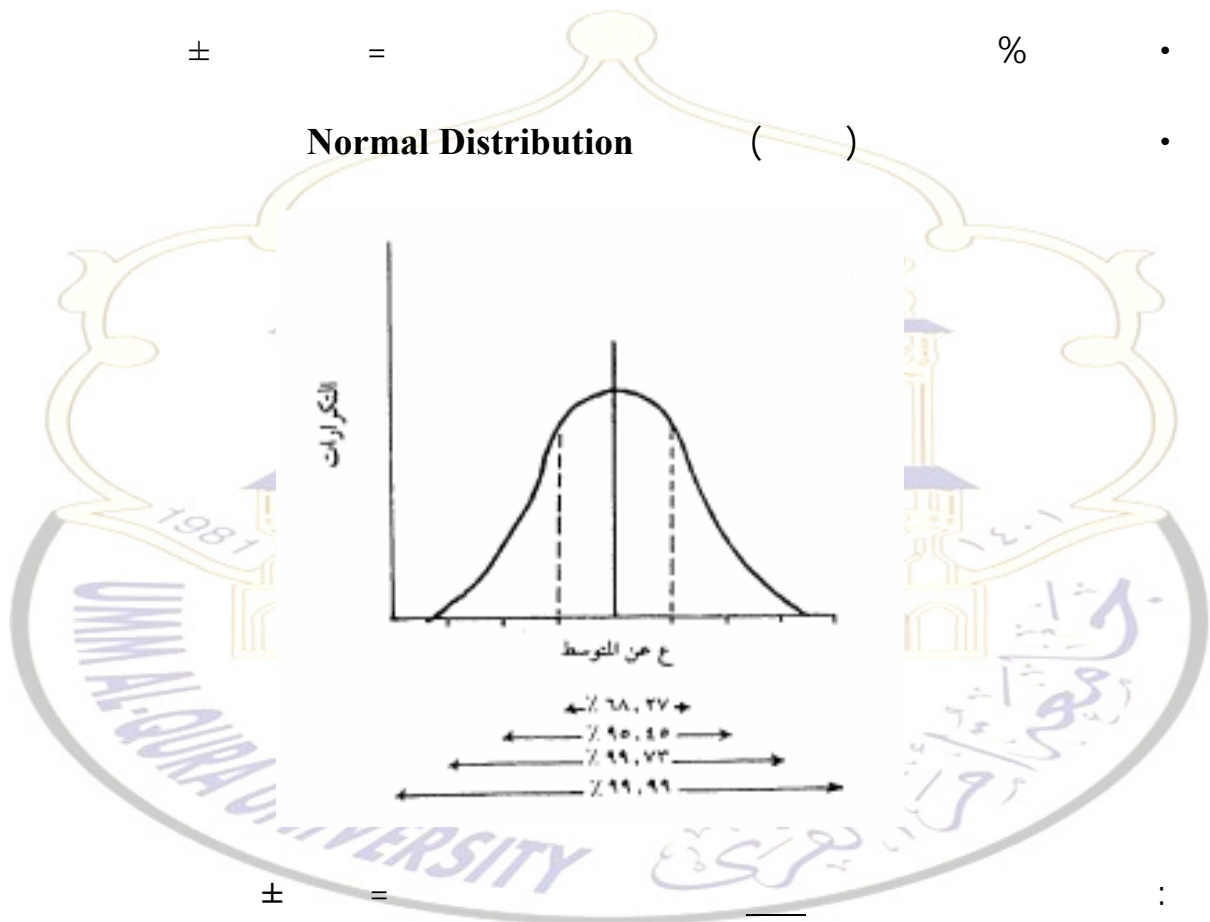
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• ( ) **Normal Distribution**



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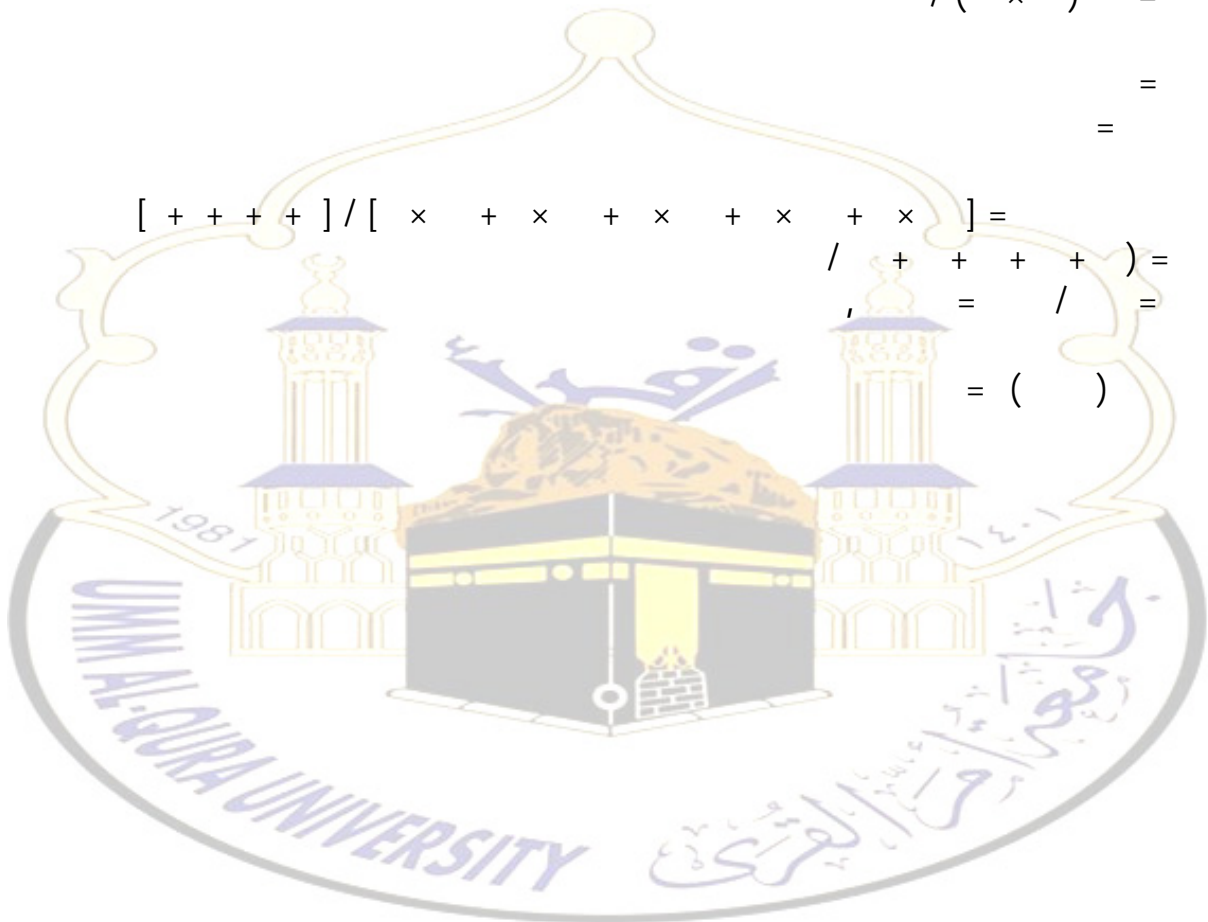
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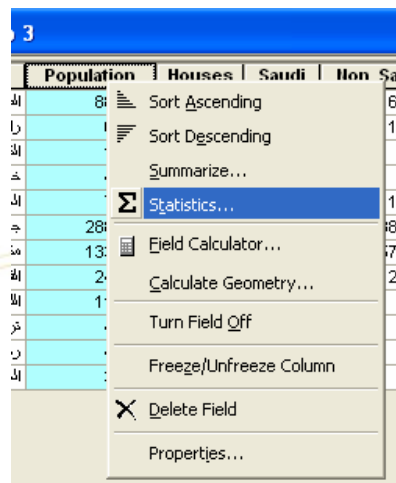
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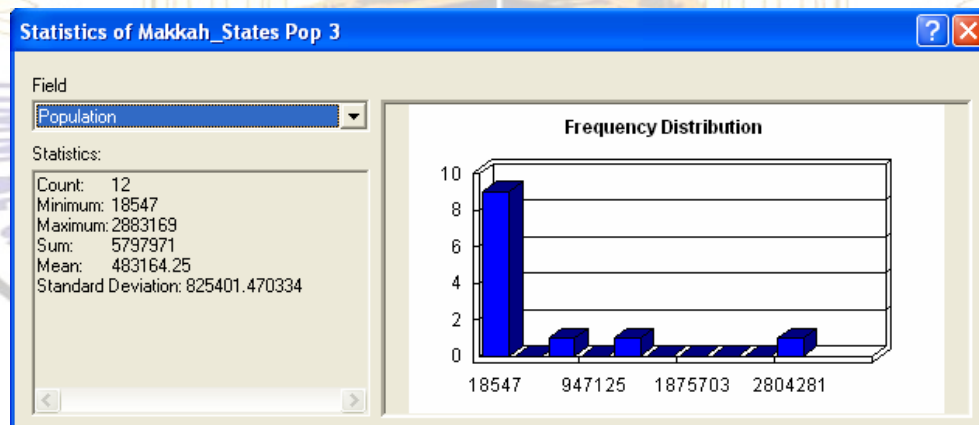
Statistics



Mean

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: Standard Deviation



: Histogram

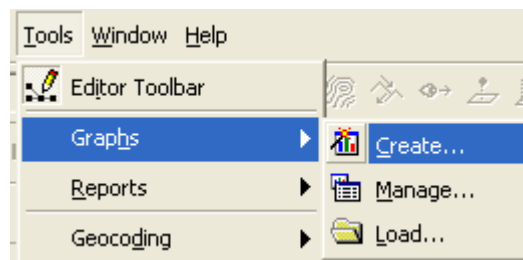
Tools – Graph – Create – Histogram  
( Median )

Create Graphs

Tools

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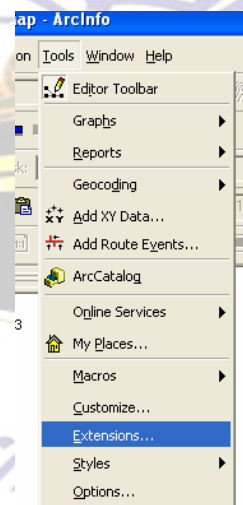


:Histogram

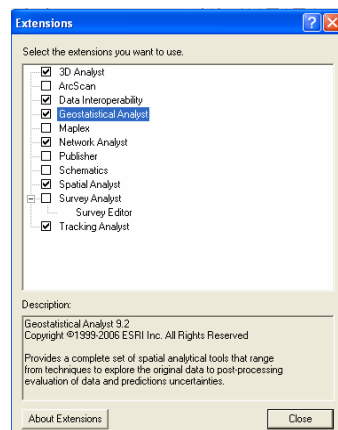


Extensions

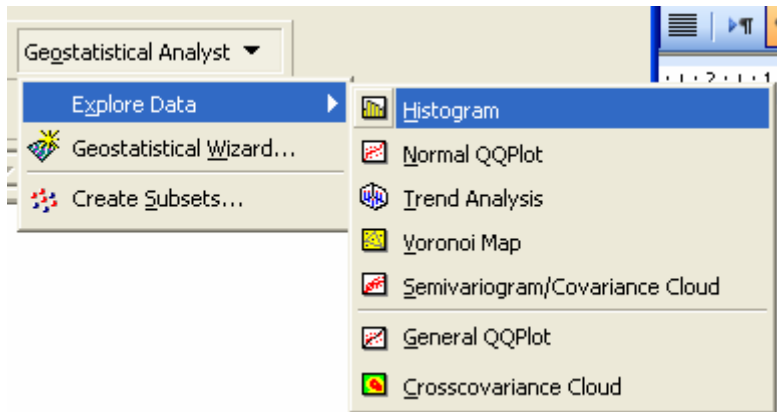
Geostatistical Analyst



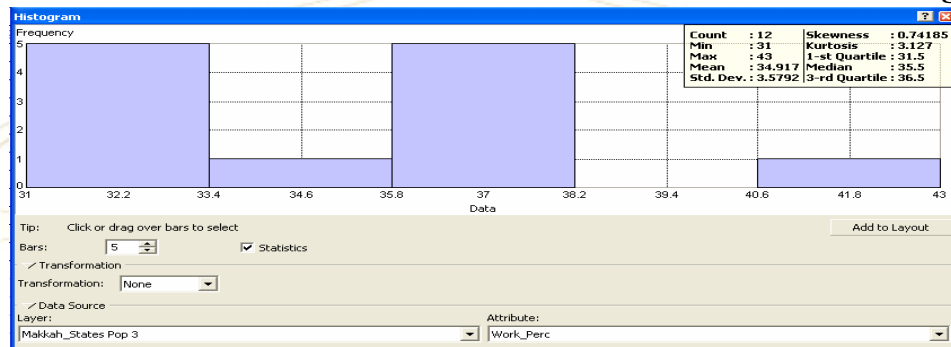
:Geostatistical Analyst



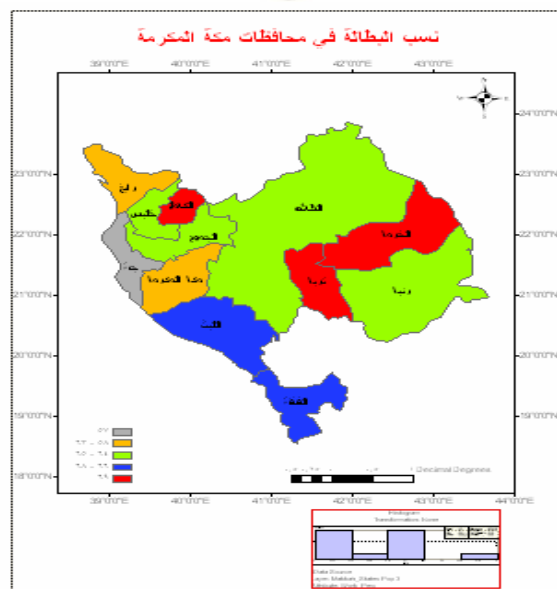
: Histogram    Explore Data    Geostatistical Analyst    :



:Histogram



Median



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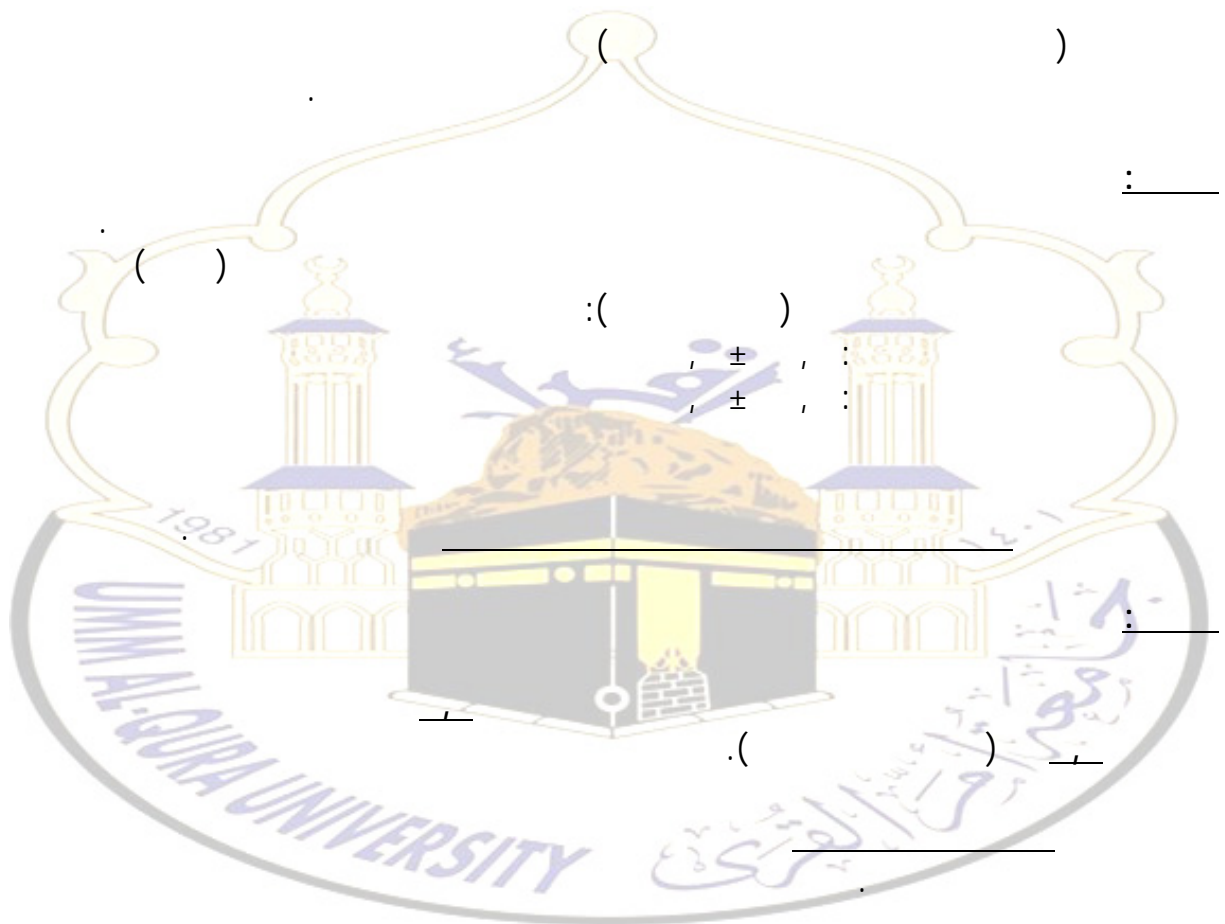
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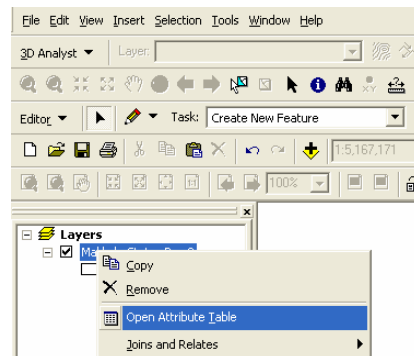
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Houses

Population

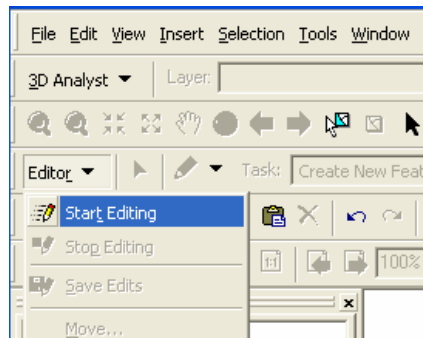
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| FID | Shape   | Id | State_Name  | Population | Houses |
|-----|---------|----|-------------|------------|--------|
| 0   | Polygon | 0  | المطائف     | 885474     | 155042 |
| 1   | Polygon | 0  | رابع        | 68966      | 14605  |
| 2   | Polygon | 0  | القطيف      | 18547      | 4053   |
| 3   | Polygon | 0  | خليص        | 49955      | 10448  |
| 4   | Polygon | 0  | الجبوع      | 75993      | 15365  |
| 5   | Polygon | 0  | جدة         | 2883169    | 635001 |
| 6   | Polygon | 0  | مكة المكرمة | 1338341    | 257054 |
| 7   | Polygon | 0  | القصبة      | 240938     | 46385  |
| 8   | Polygon | 0  | البيث       | 110449     | 17386  |
| 9   | Polygon | 0  | نربة        | 42810      | 8140   |
| 10  | Polygon | 0  | رنية        | 44276      | 7118   |
| 11  | Polygon | 0  | الشرمة      | 39053      | 6860   |

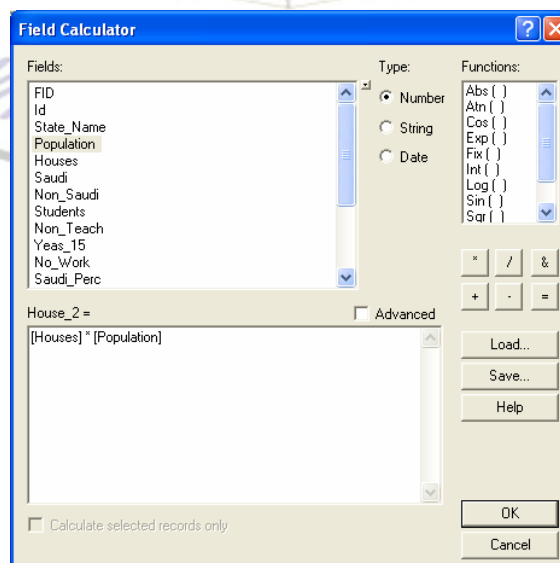
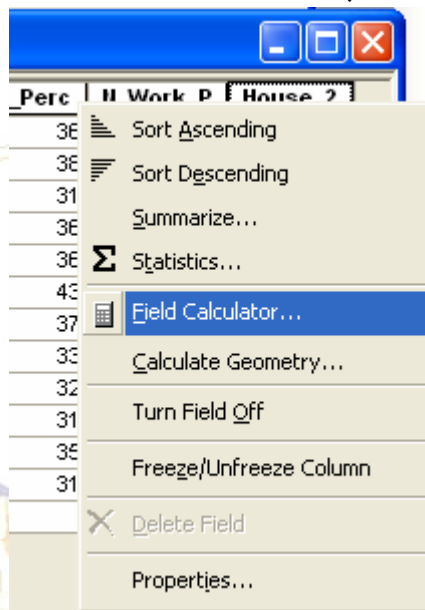
The screenshot shows the 'Add Field' dialog box in ArcGIS Desktop. The 'Name' field is set to 'House\_2' and the 'Type' is set to 'Short Integer'. The 'Field Properties' section shows the 'Precision' set to '15'. The 'OK' button is highlighted.

| vs_15  | No_Work | Saudi_Perc | Isaudi_Per | House_1 | Stud_Perc |
|--------|---------|------------|------------|---------|-----------|
| 135400 | 158097  |            |            |         | 33.7      |
| 33237  | 12708   |            |            |         | 31.6      |
| 9596   | 3016    |            |            |         | 38.5      |
| 26533  | 9617    |            |            |         | 37.6      |
| 39119  | 13999   |            |            |         | 36.2      |
| 331091 | 401578  |            |            |         | 19.7      |
| 315953 | 190261  |            |            |         | 19        |
| 129897 | 42394   |            |            |         | 36.6      |
| 56155  | 17962   |            |            |         | 39        |
| 21874  | 6790    |            |            |         | 33.1      |
| 23203  | 8015    |            |            |         | 32.3      |
| 19418  | 6007    |            |            |         | 34.7      |

of 12 Selected)



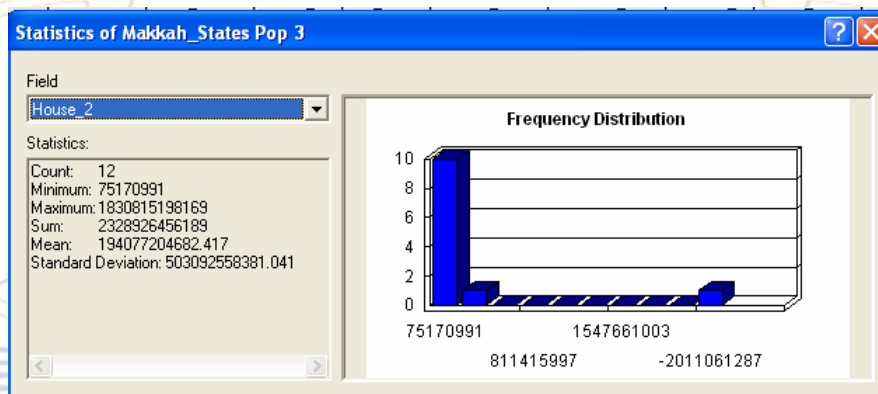
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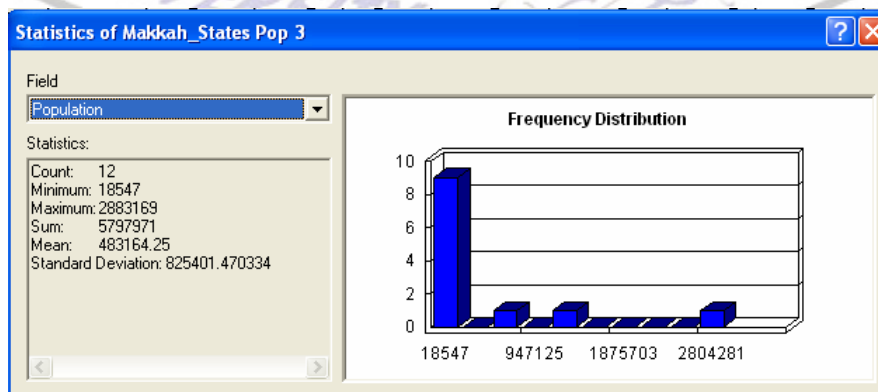
OK

| Work_P | House_2   |
|--------|-----------|
| 64     | 137285659 |
| 62     | 100724843 |
| 69     | 75170991  |
| 64     | 521929840 |
| 64     | 116763244 |
| 57     | 183081519 |
| 63     | 344025907 |
| 67     | 111759091 |
| 68     | 192026631 |
| 69     | 348473400 |
| 65     | 315156568 |
| 69     | 267903580 |

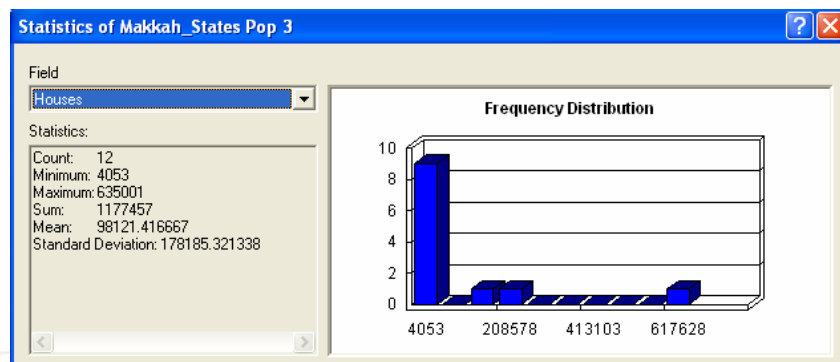
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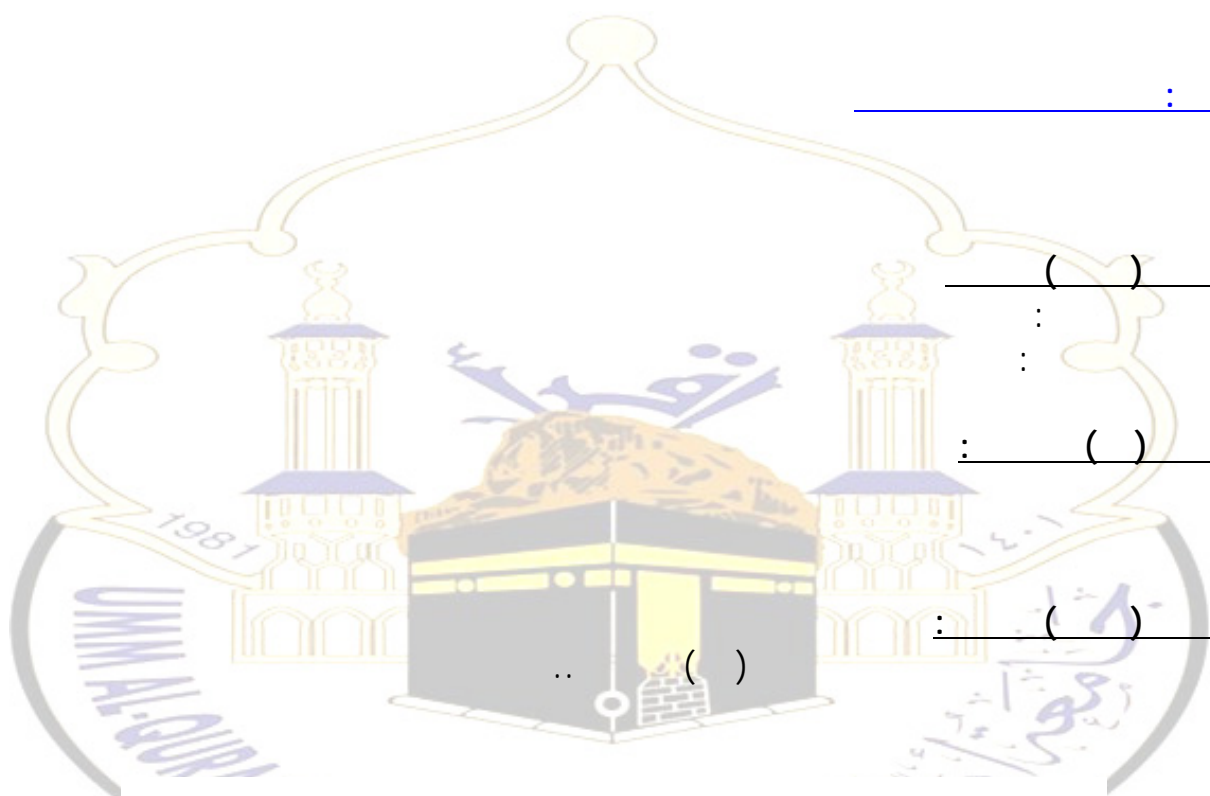
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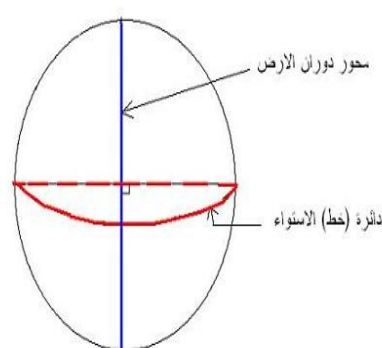
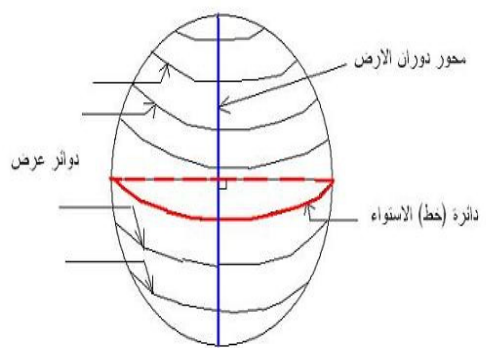
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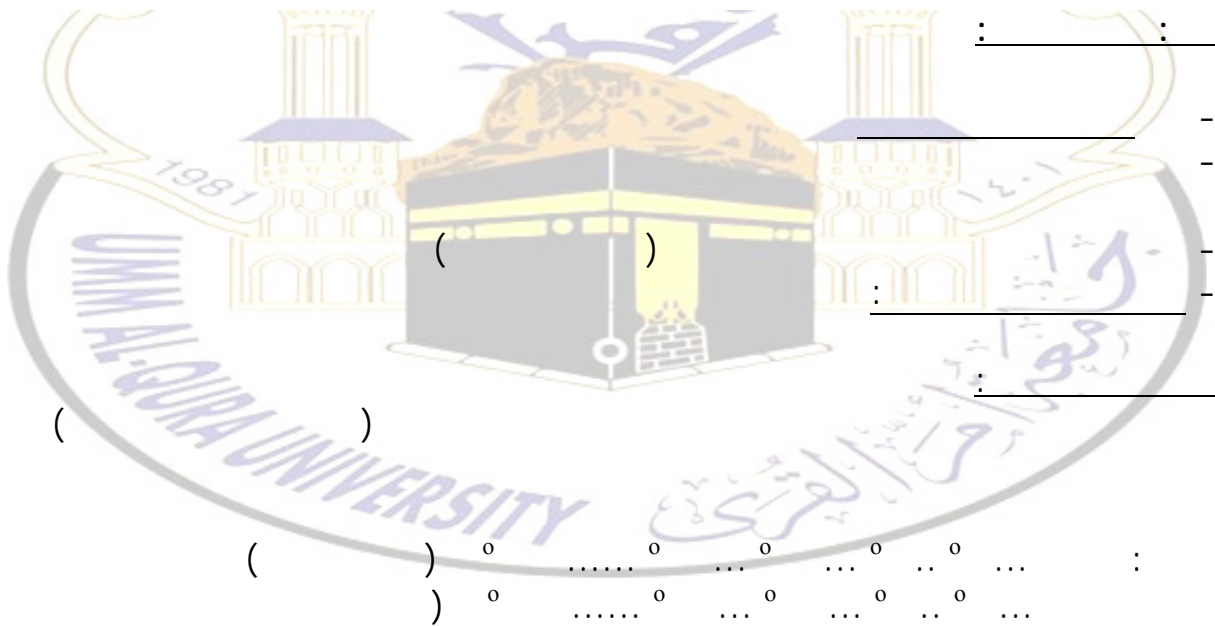
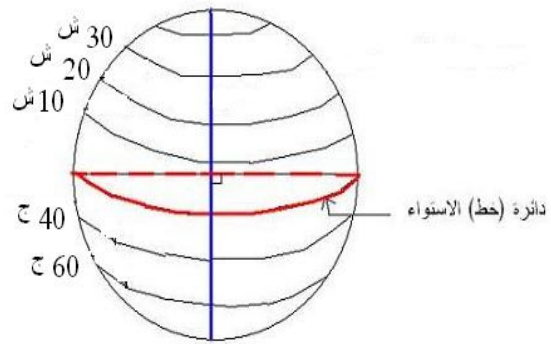
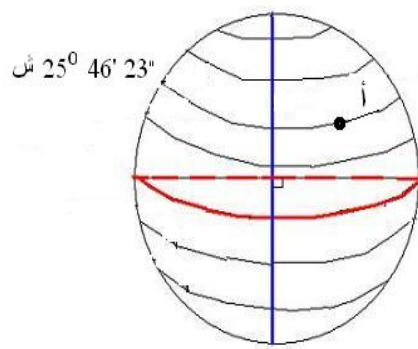
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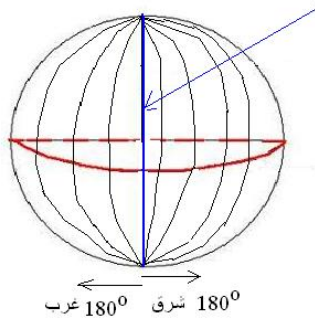
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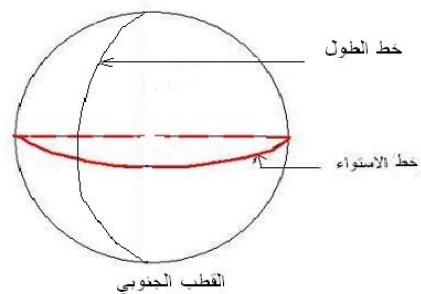
معرفة موقع نقطة بمعرفة خط (دائرة) العرض السار بها



خط طول جرينتش = صفر



القطب الشمالي



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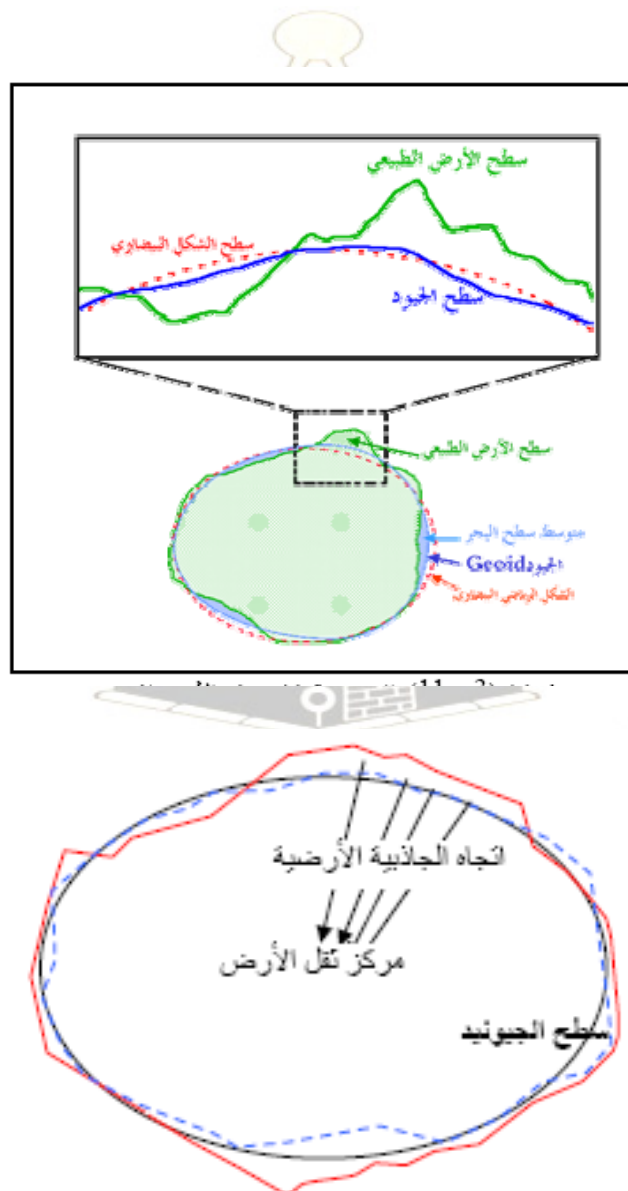
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## Ellipsoid



# Ellipsoid

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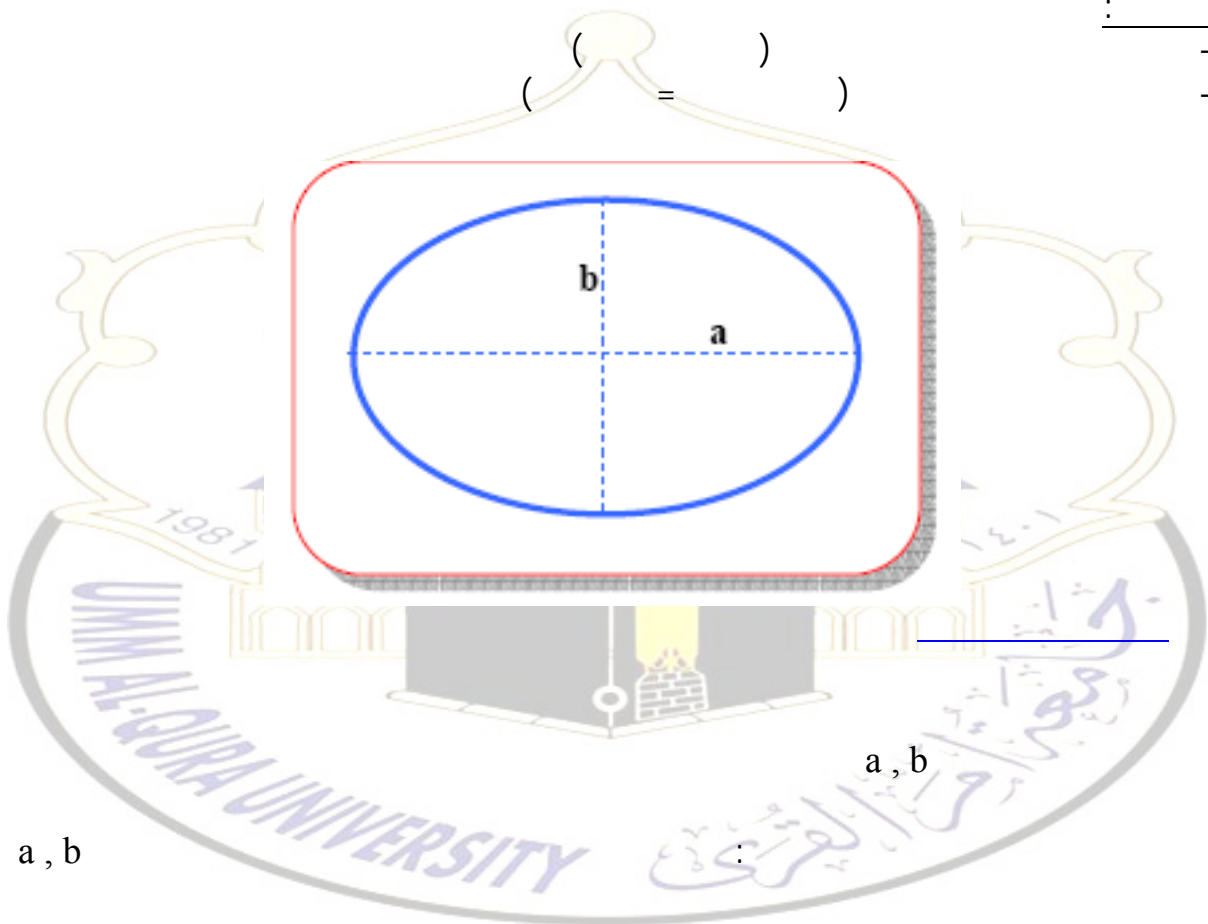
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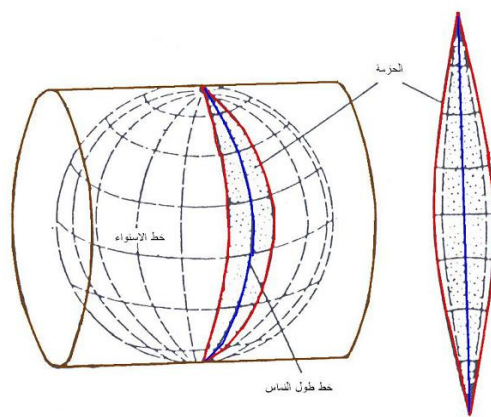
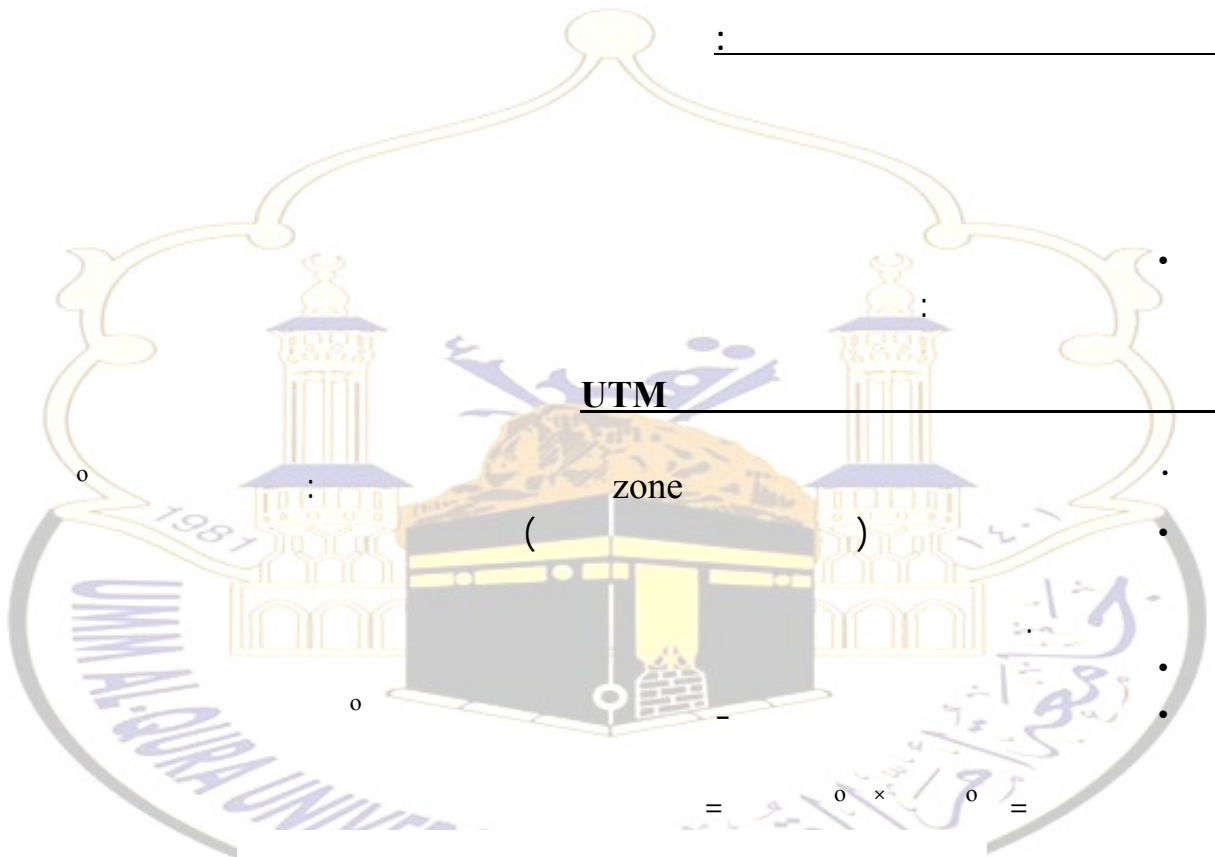
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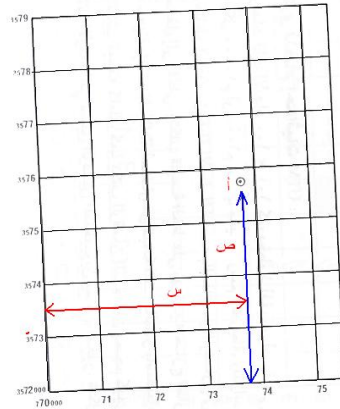


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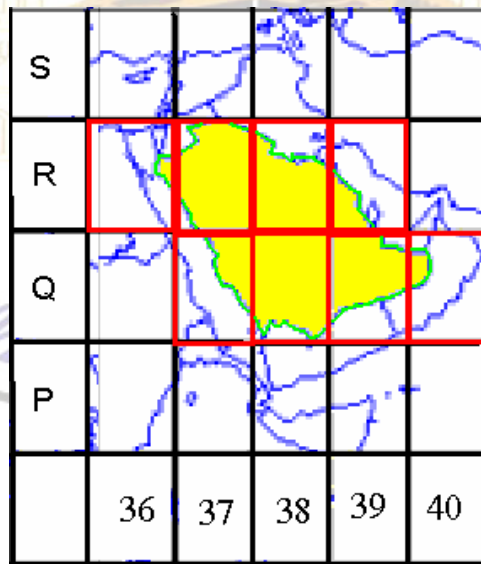
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## ArcGIS

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ArcGIS

ArcGIS

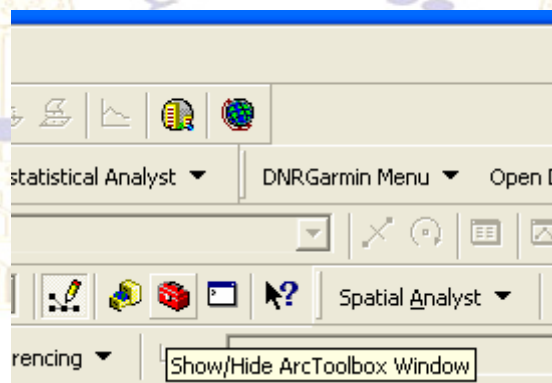
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## Arc ToolBox

Arc

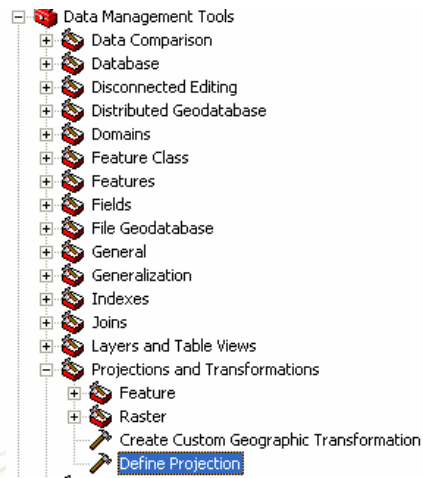
ArcMap

Cataloge





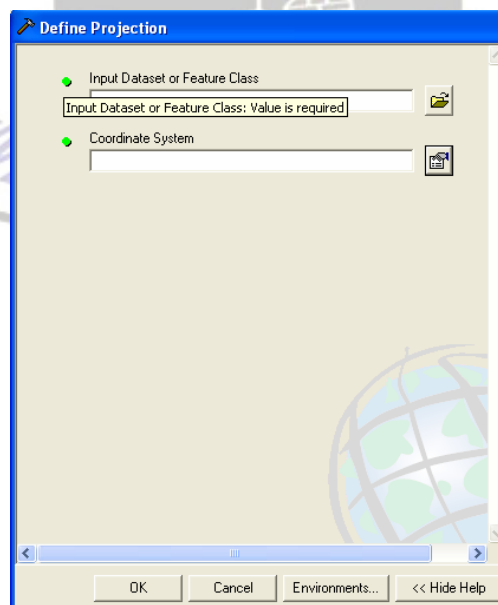
## Define Projection



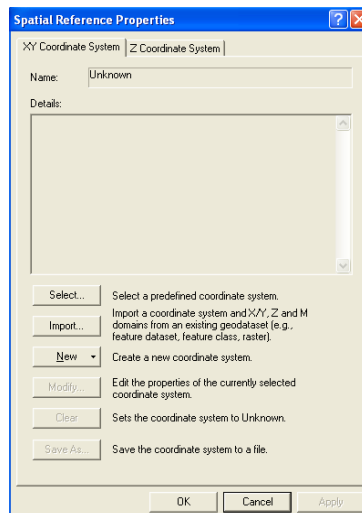
Map Projection  
Arc Catalogue

Datum

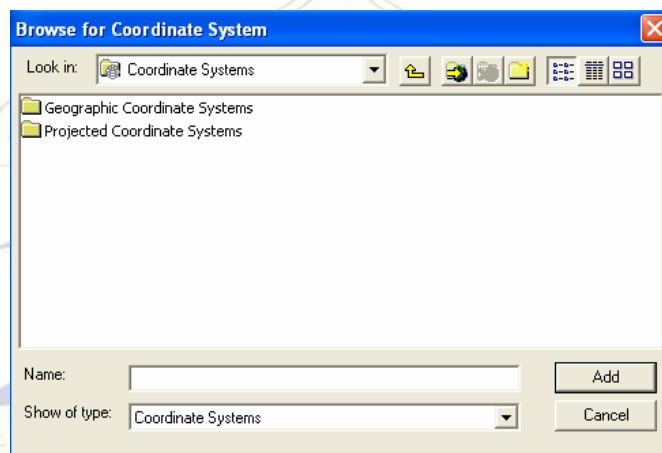
Input Dataset or Feature Class  
Coordinate System



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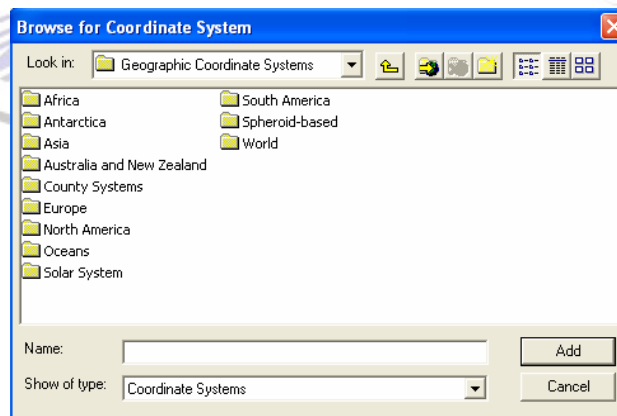


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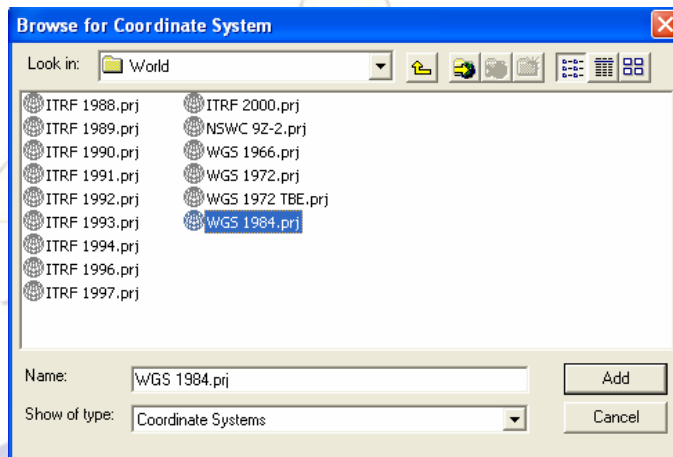
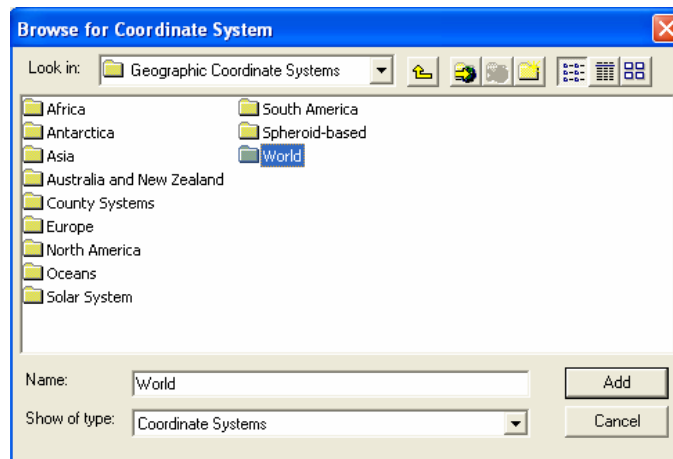
Geographic Coordinate Systems

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WGS 1984

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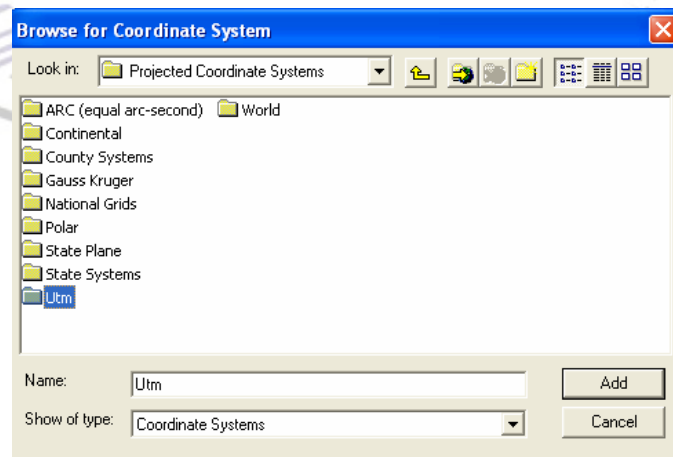


Projected Coordinate Systems

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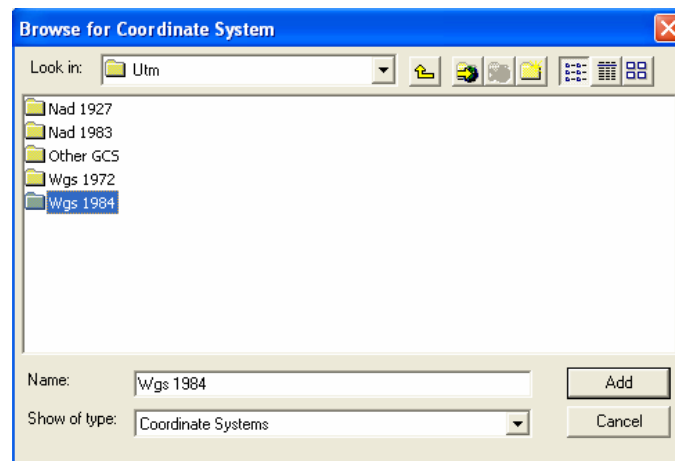
UTM



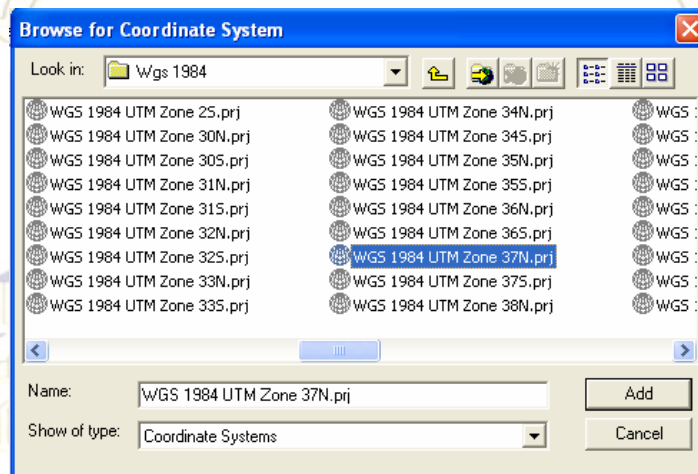
Datum

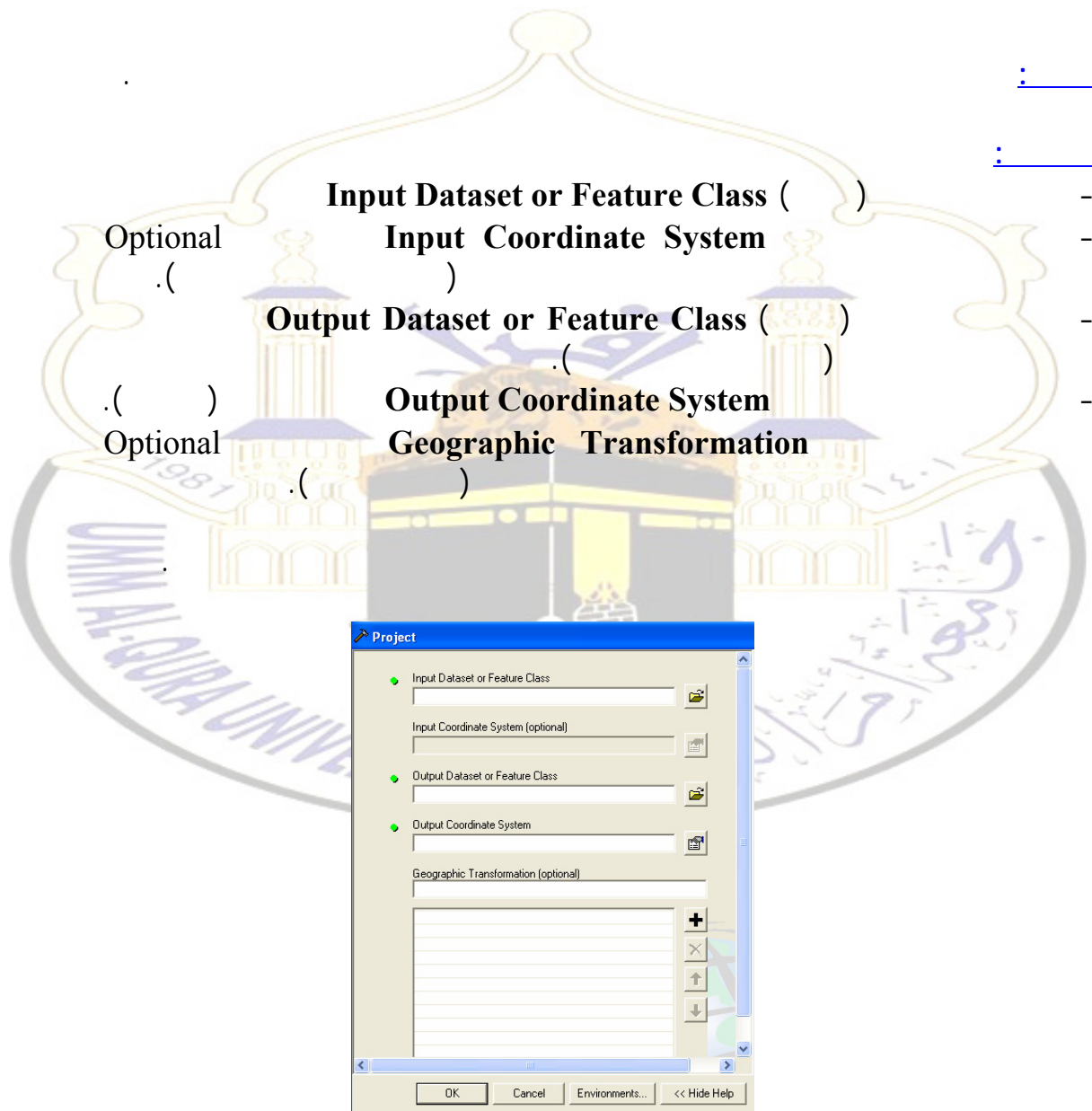
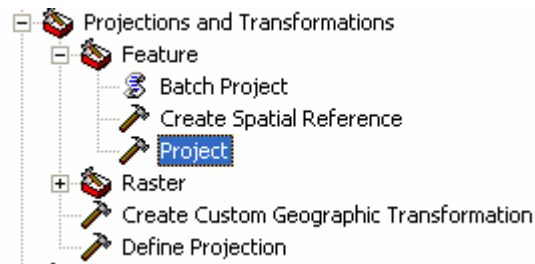
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WGS 1984



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## Spatial Data Analysis

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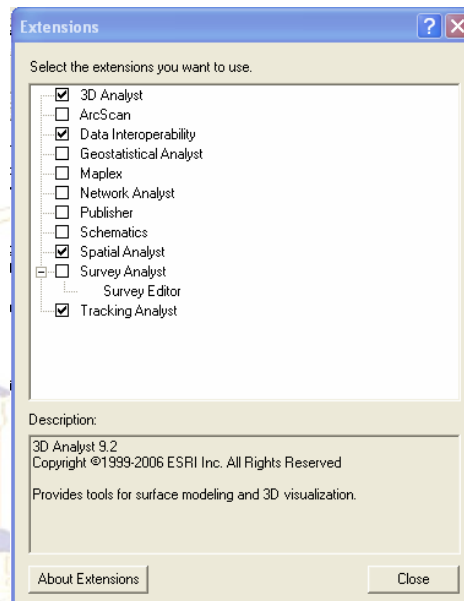
:Arc GIS

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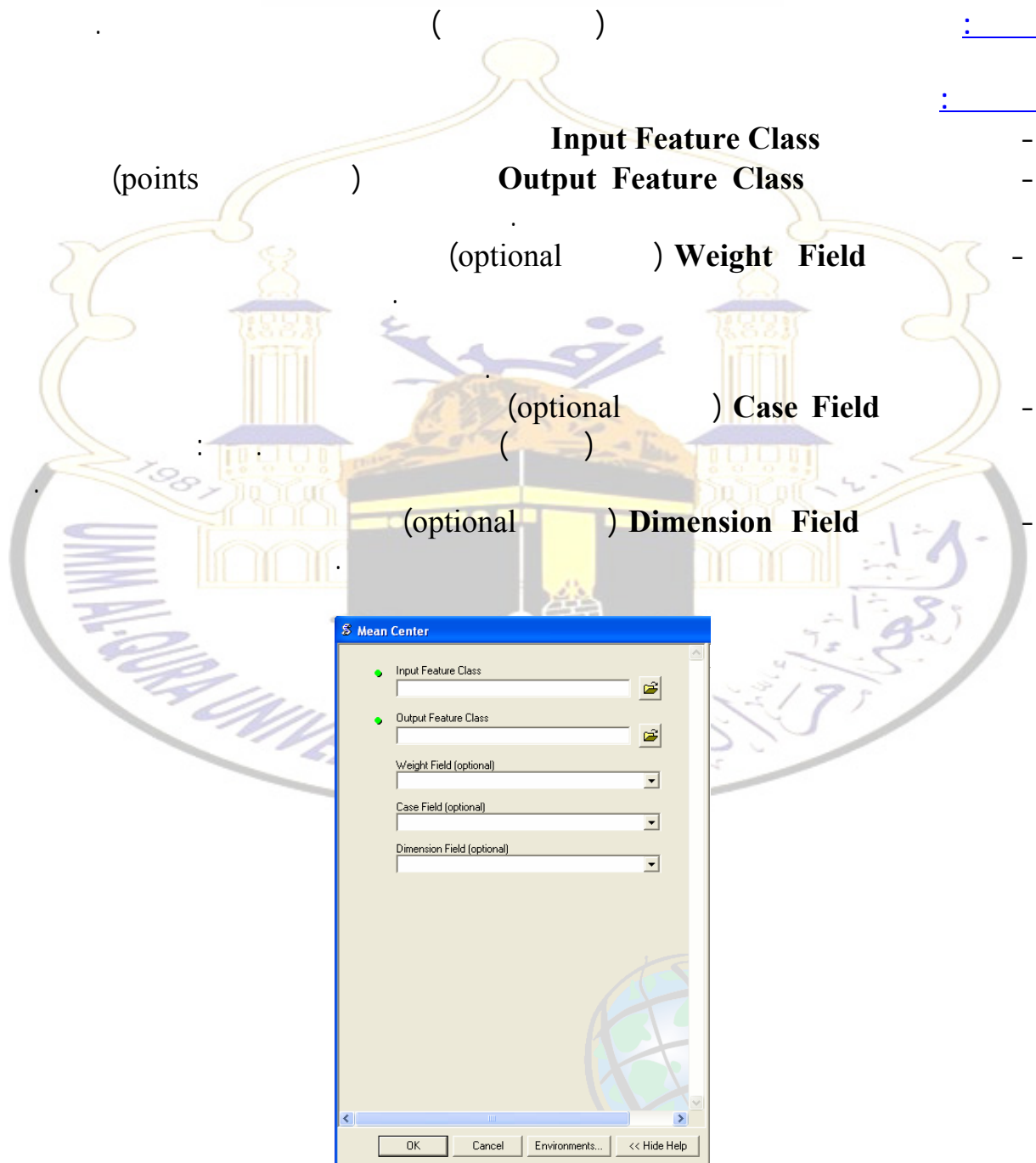
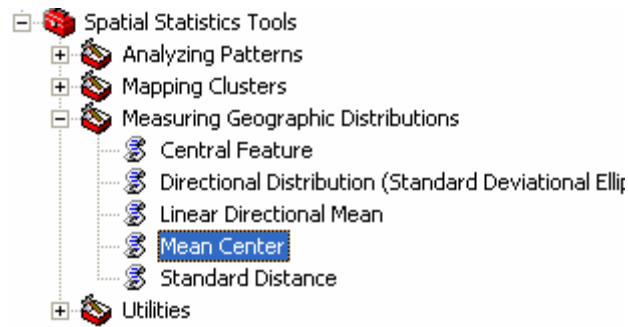
Spatial Analyst

Extensions

Tolls



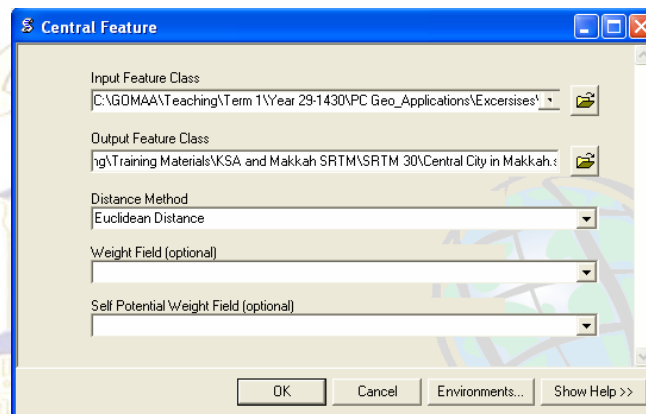
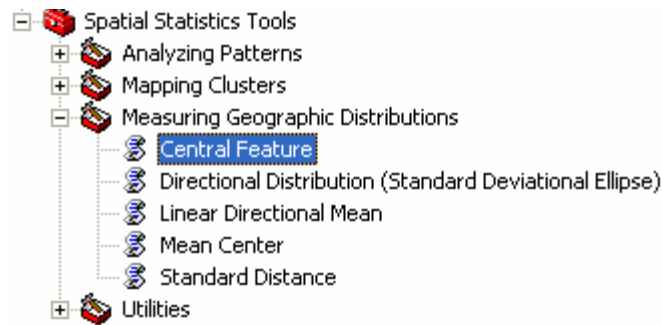
## Mean Center



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## Central Feature ( )

Point Layer



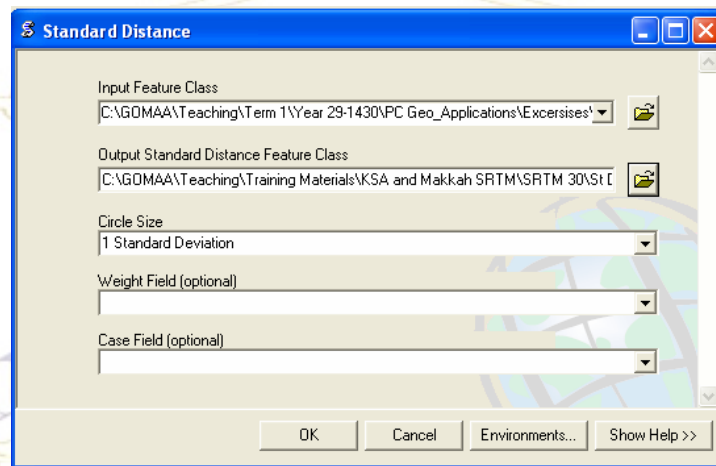
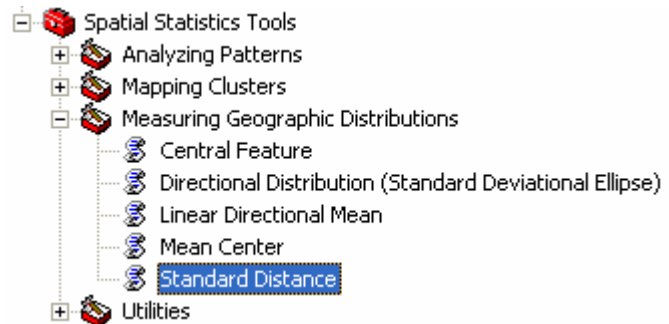
(points )      **Input Feature Class**      -  
**Output Feature Class**      -  
(optional ) **Weight Field**      -



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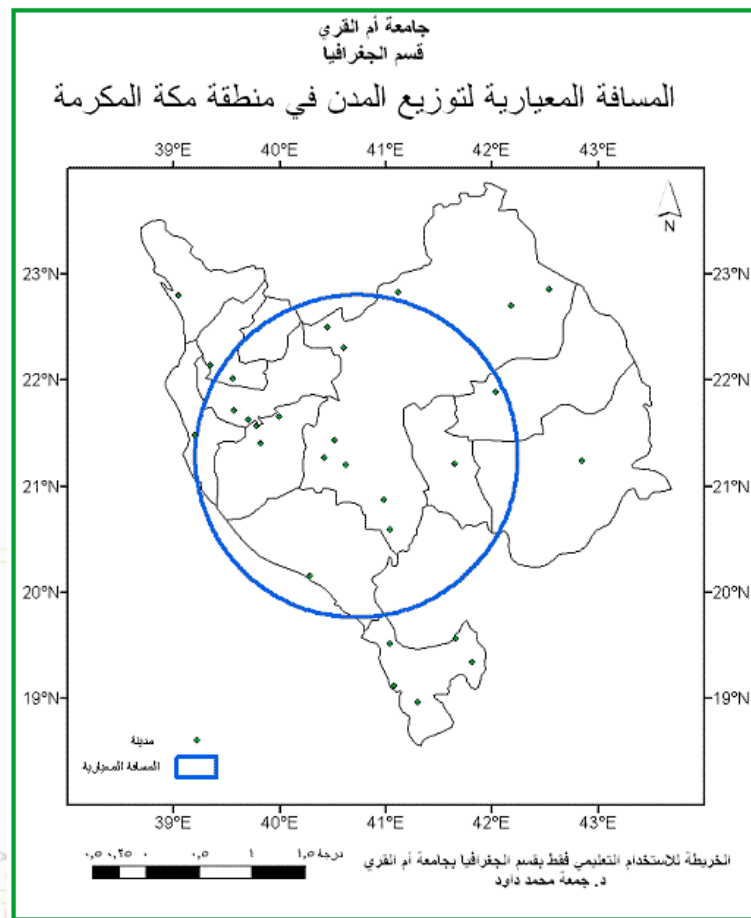
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## Standard Distance



**Input Feature Class**  
**Output Feature Class**

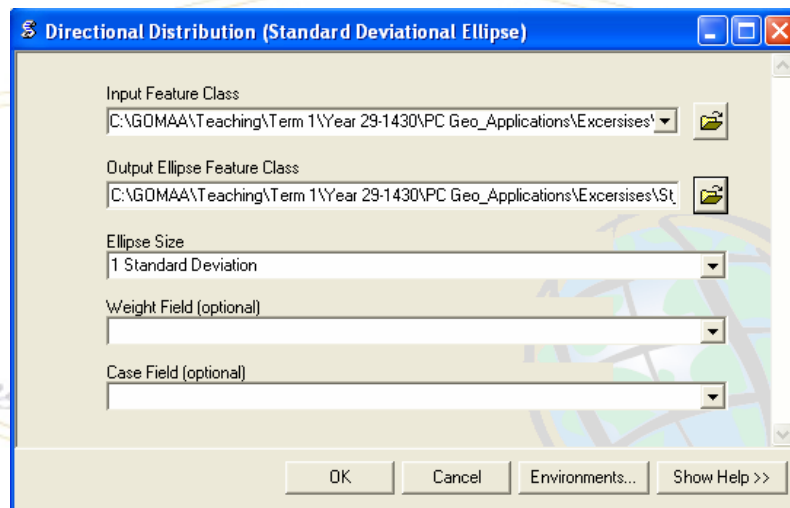
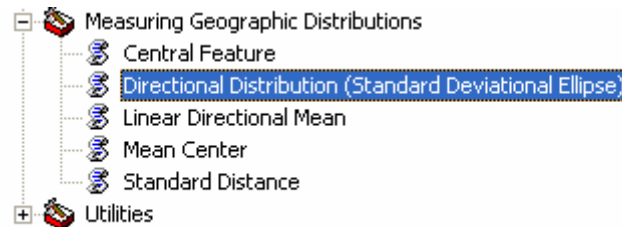
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**Directional Distribution or Standard Deviation Ellipse**

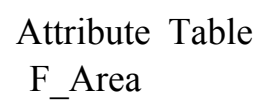


**Input Feature Class**  
**Output Feature Class**  
(ellipse )



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### Output Feature Class ( )



## Arc GIS

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## Nearest Neighbor Analysis Point Layer

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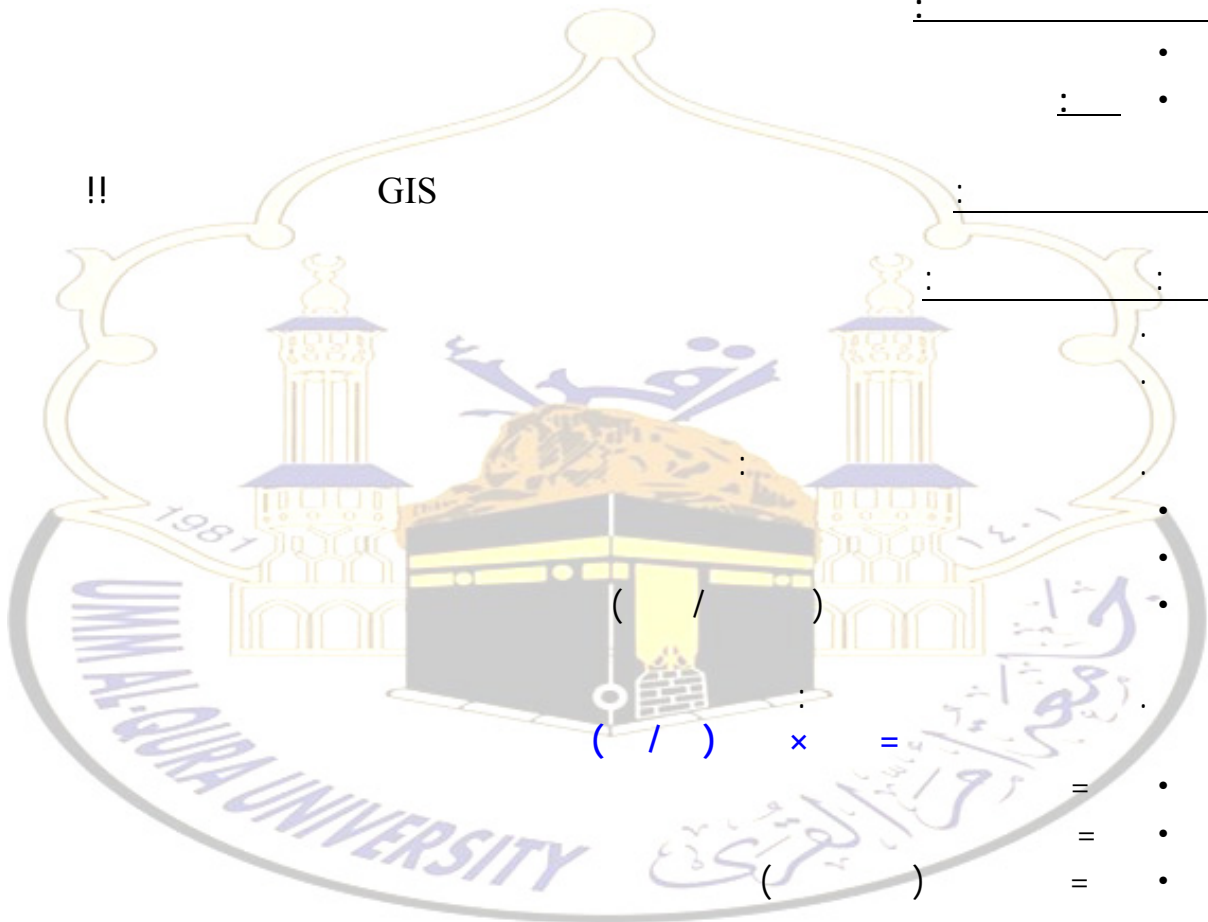
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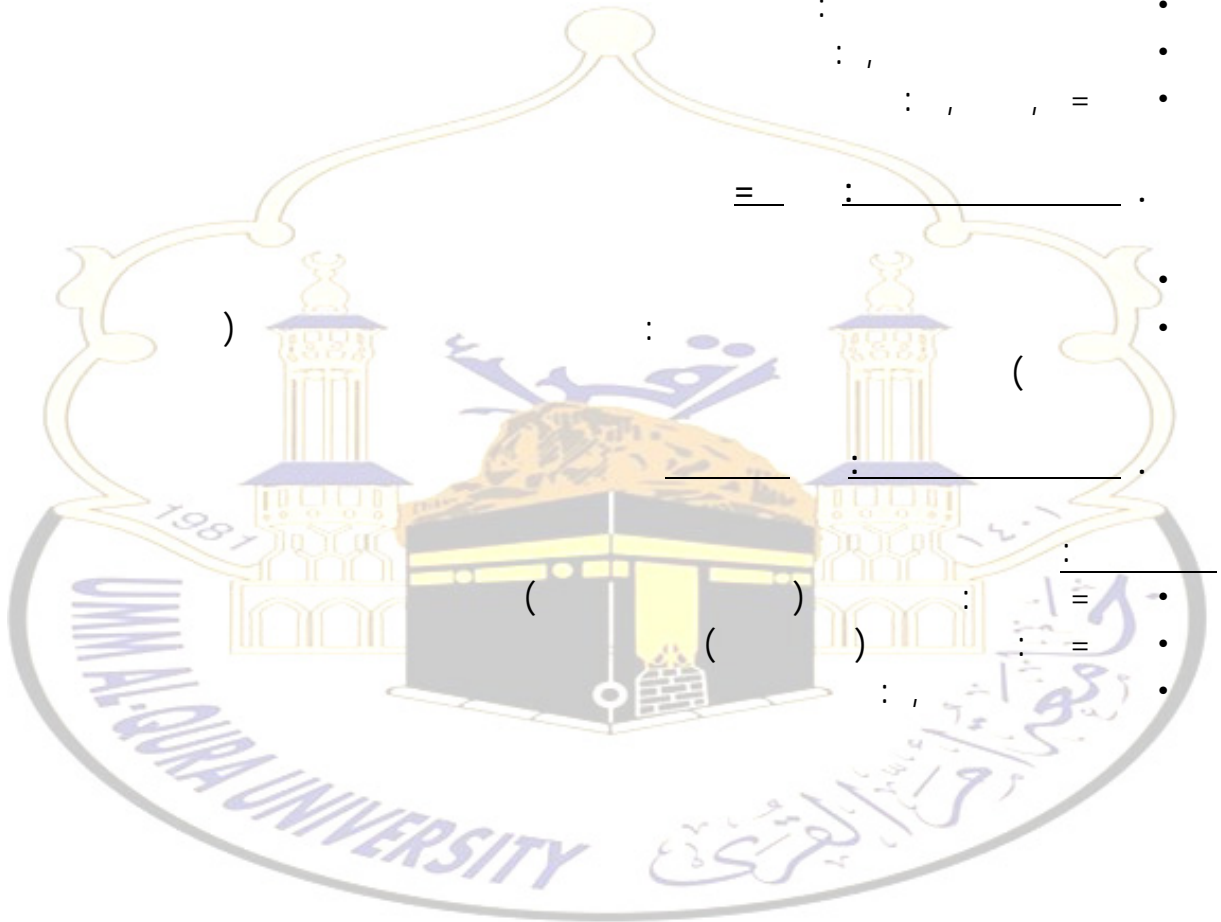
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| المنطقة         | معامل الجار الأقرب | المنطقة                     | معامل الجار الأقرب |
|-----------------|--------------------|-----------------------------|--------------------|
| المنطقة الشرقية | ٠,٦٣               | جازان                       | ١,٣٩               |
| القصيم          | ٠,٦٨               | مكة المكرمة                 | ١,٤٧               |
| الجوف           | ٠,٧٩               | نجران                       | ١,٤٧               |
| الرياض          | ٠,٨٣               | حائل                        | ١,٥٣               |
| الباحة          | ٠,٨٣               | المدينة المنورة             | ١,٥٧               |
| عسير            | ١,٠٩               | الحدود الشمالية             | ١,٦٣               |
|                 |                    | تبوك                        | ١,٦٩               |
|                 |                    |                             |                    |
|                 |                    | كل المملكة العربية السعودية | ٠,٩٨               |

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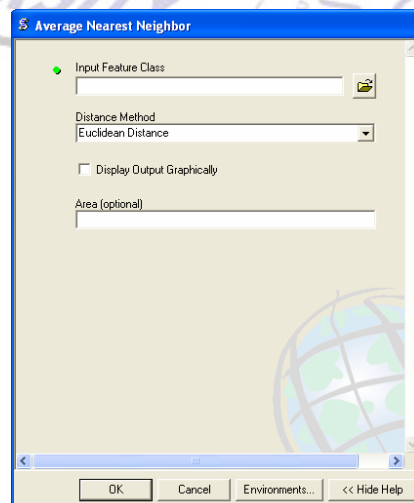
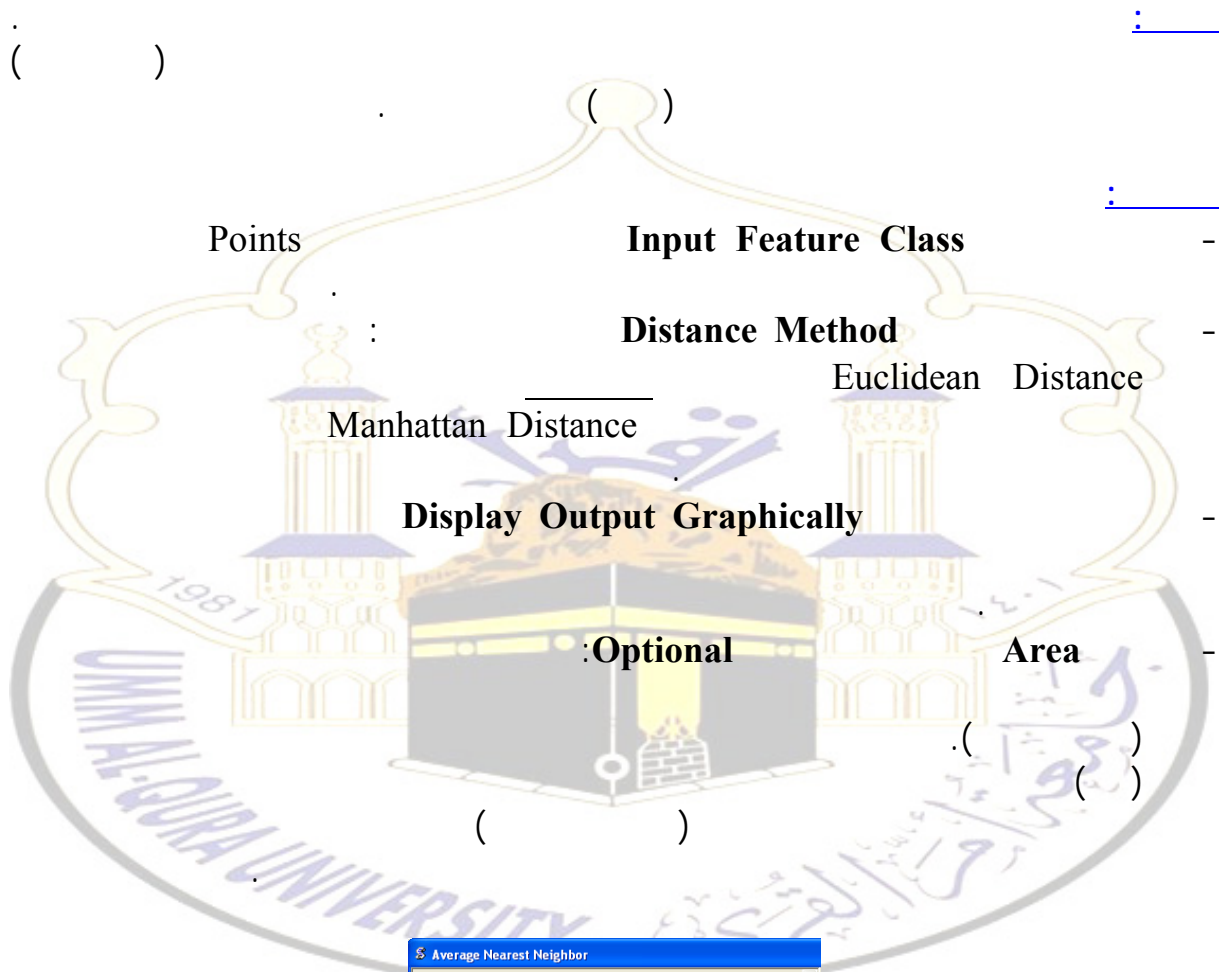
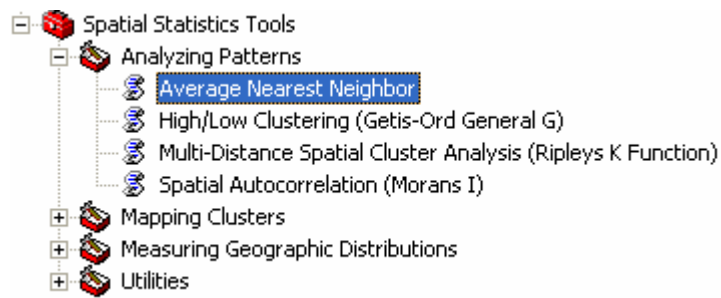
\_\_\_\_\_:

| نمط التوزيع      | معامل الجار الأقرب | المحافظة          |
|------------------|--------------------|-------------------|
| متجمع            | ٠,٣٠               | الخرمة            |
| متقارب           | ٠,٧٤               | رنية              |
|                  | ٠,٨٨               | رابغ              |
|                  | ٠,٥٩               | الطائف            |
|                  | ٠,٩٠               | ديوان الإمارة     |
| عشوائي           | ٠,٩٧               | الكامل            |
|                  | ٠,٩٧               | القنفذة           |
| متباعد           | ١,٠٣               | جدة               |
|                  | ١,١٤               | الليث             |
|                  | ١,٢٠               | حلبص              |
|                  | ١,٢٢               | الجموم            |
|                  | ١,٢٦               | تربة              |
|                  |                    |                   |
| متقارب غير منتظم | ٠,٧٧               | منطقة مكة المكرمة |

:



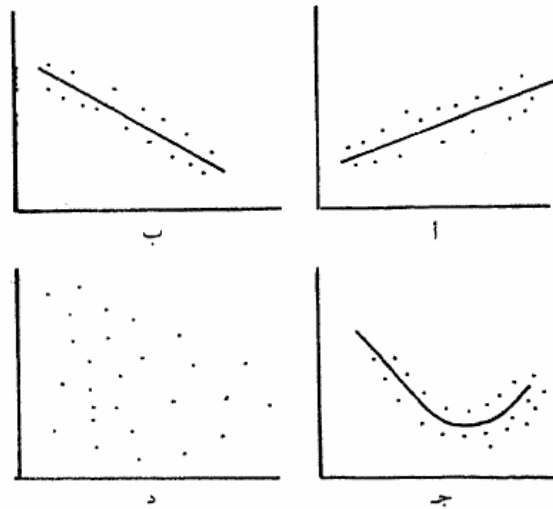
## Arc Tool Box



## Arc GIS

## Regression

- ( ) ( )
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- ( )



| State_IName | Population | Schools |
|-------------|------------|---------|
| الطائف      | 885474     | 279     |
| رايح        | 68966      | 36      |
| الكامل      | 18547      | 30      |
| خليص        | 49955      | 48      |
| الجهوم      | 75993      | 49      |
| جدة         | 2883169    | 348     |
| مكة المكرمة | 1338341    | 227     |
| القطنة      | 240938     | 205     |
| الليث       | 110449     | 116     |
| تربة        | 42810      | 27      |
| رنية        | 44276      | 22      |
| الخرمة      | 39053      | 22      |

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/ =

Field

Attribute Table

:

Calculator

| Sokan_1_Sc |
|------------|
| 3174       |
| 1916       |
| 618        |
| 1041       |
| 1551       |
| 8285       |
| 5896       |
| 1175       |
| 952        |
| 1586       |
| 2013       |
| 1775       |

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Statistics

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: Regression

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: Statistics Arc GIS

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: ( × )  
 × = Field Calculator  
 = sum Statistics

| Sch_Pop    |
|------------|
| 247047246  |
| 2482776    |
| 556410     |
| 2397840    |
| 3723657    |
| 1003342812 |
| 303803407  |
| 49392290   |
| 12812084   |
| 1155870    |
| 974072     |
| 859166     |

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 =

= Field Calculator  
 sum Statistics × =



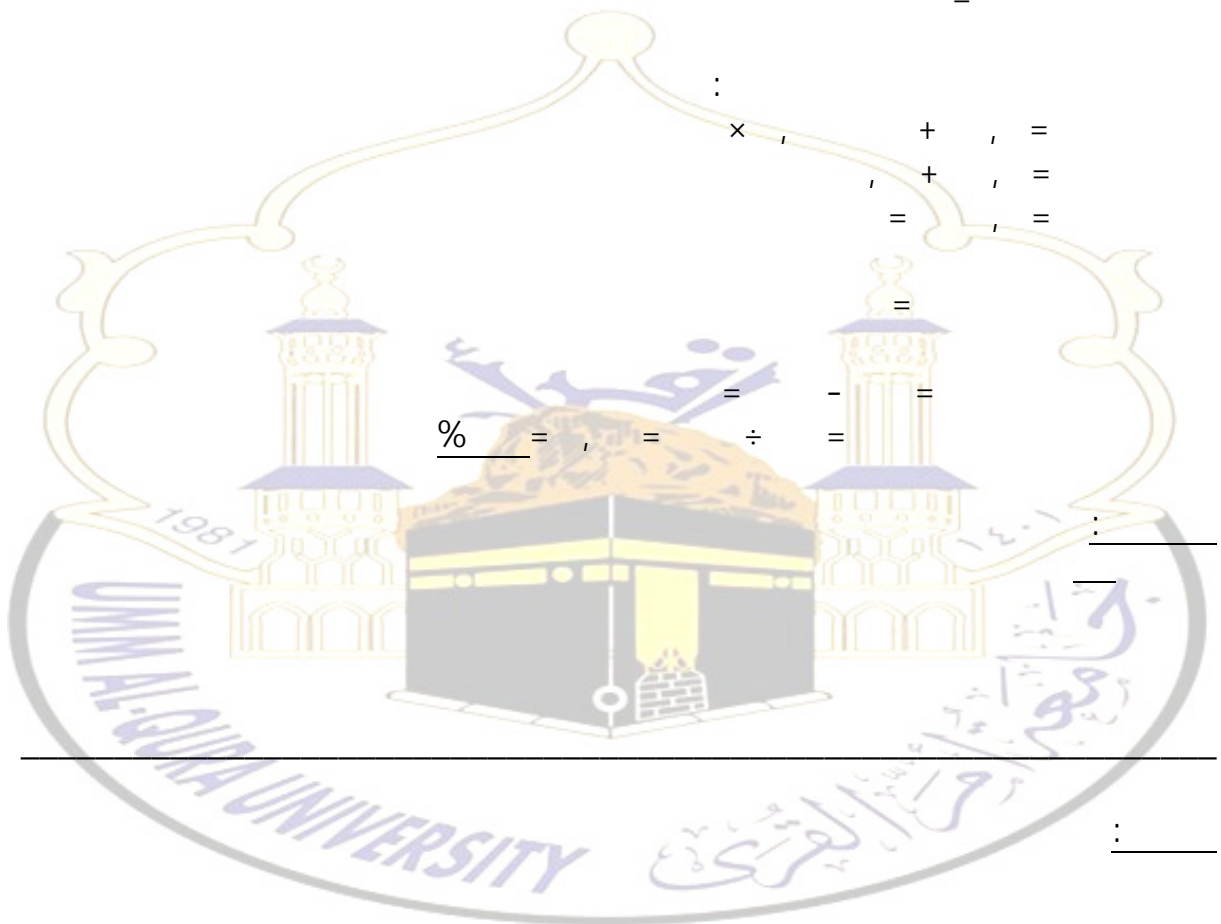
\_\_\_\_\_ : \_\_\_\_\_

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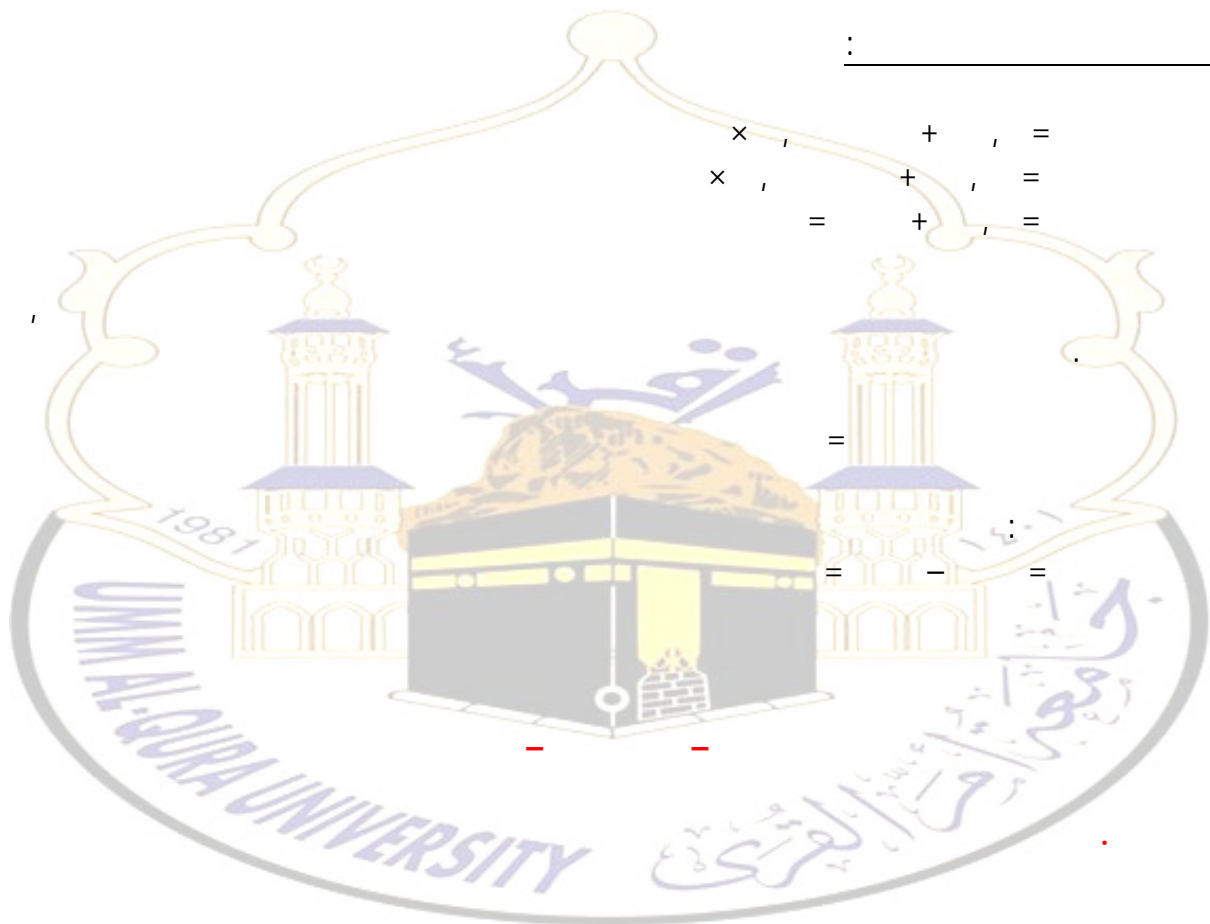
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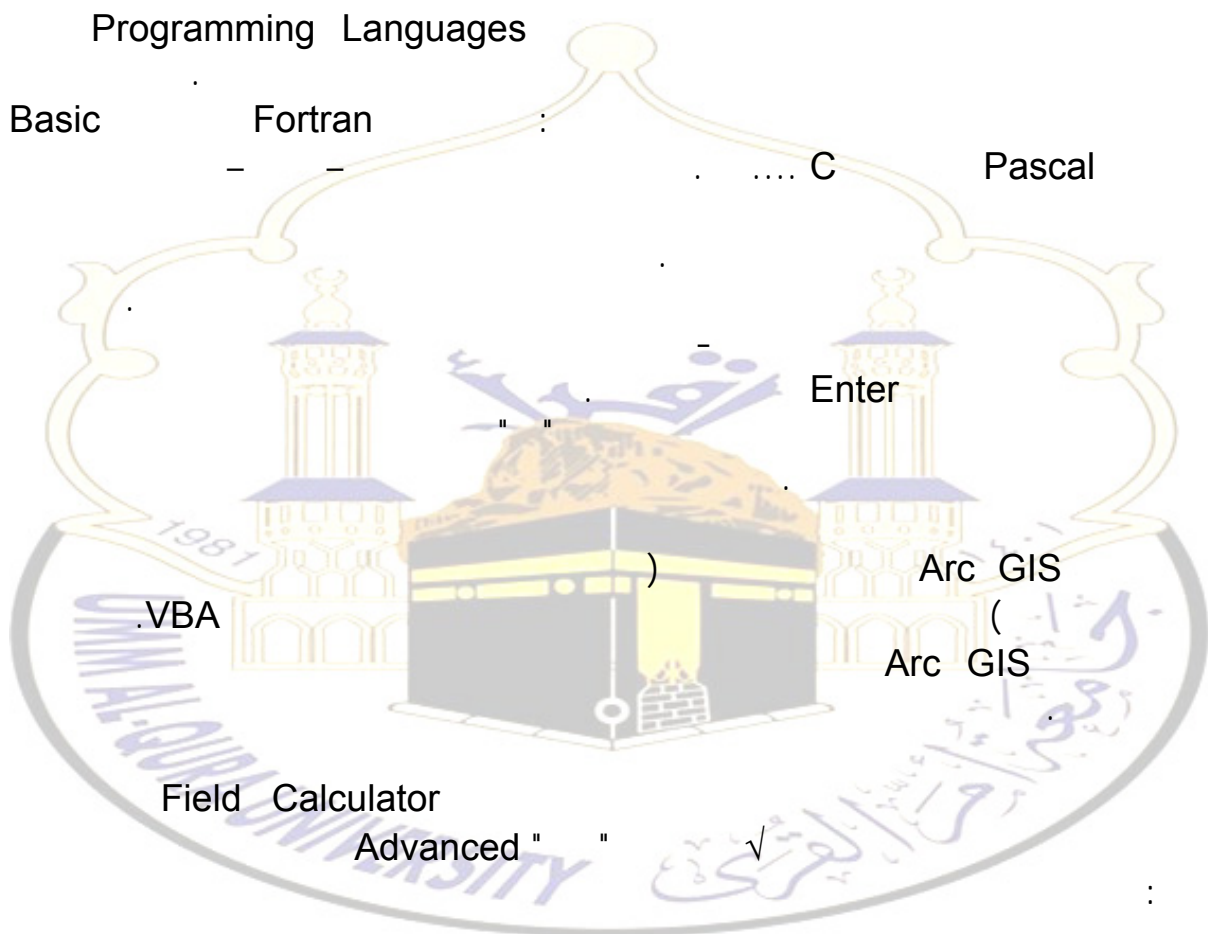
: Prediction



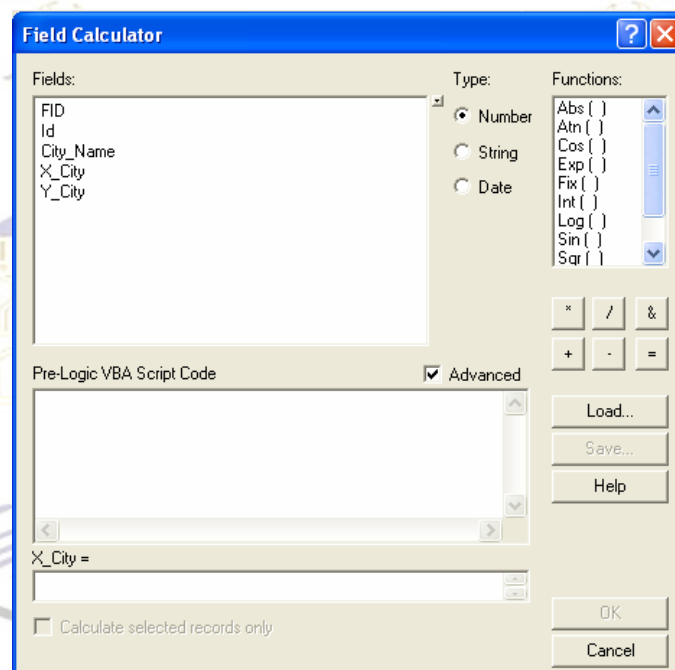
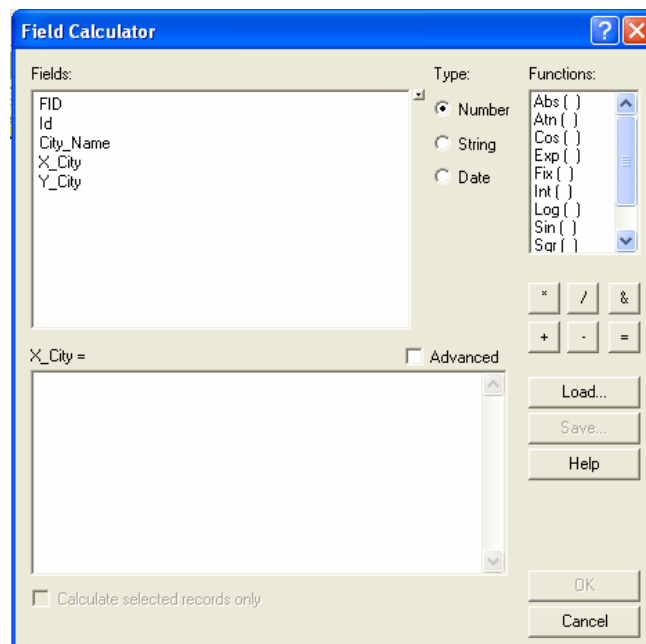
---

## Arc GIS

Attribute Table  
( .. ) Field Calculator  
Visual Basic  
- Arc GIS







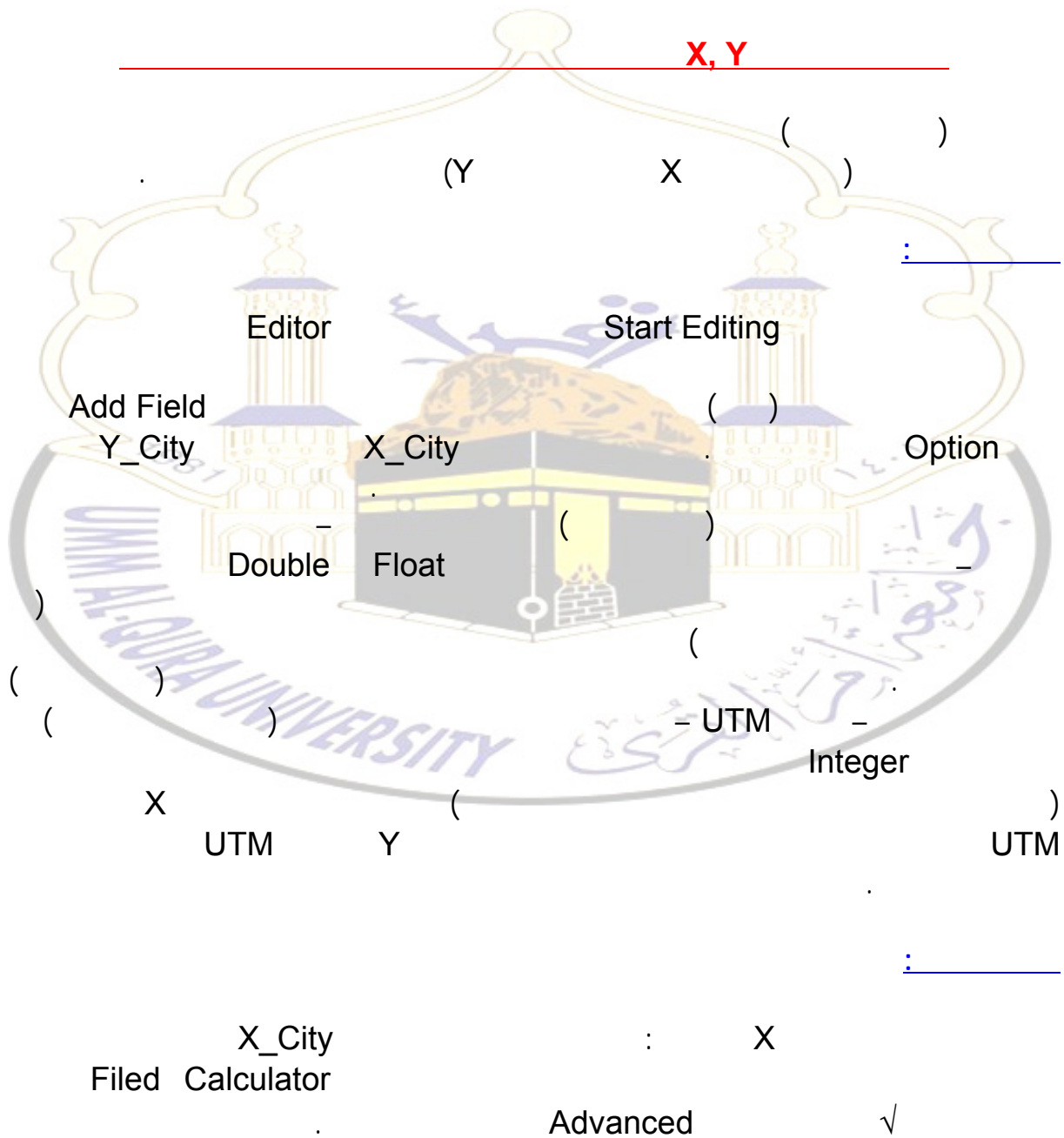
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Pre-Logic BBA Script Code

X, Y  
X, Y

1.  
2.  
3.  
4.  
5.



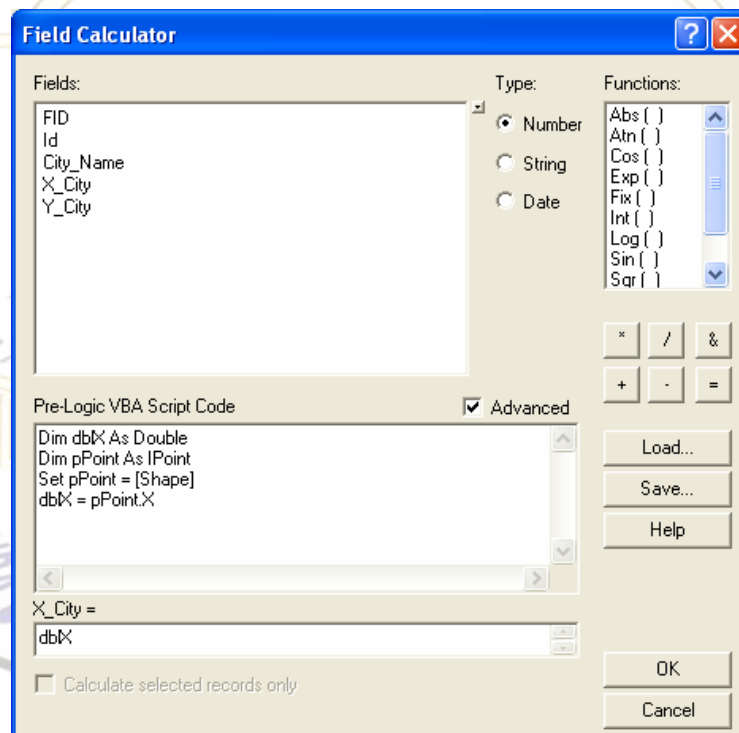
Copy )

Arc GIS

(and Paste

: X  
Dim dblX As Double  
Dim pPoint As IPoint  
Set pPoint = [Shape]  
dblX = pPoint.X

dblX



OK

Arc

(Copy and Paste

Y

GIS

:

)

:(

```
Dim dblY As Double
Dim pPoint As IPoint
Set pPoint = [Shape]
dblY = pPoint.Y
```

OK

: ( )

| FID | Shape | Id | City_Name   | X_City | Y_City  |
|-----|-------|----|-------------|--------|---------|
| 0   | Point | 0  | طلم         | 826939 | 2514675 |
| 1   | Point | 0  | رابغ        | 504961 | 2521804 |
| 2   | Point | 0  | جدة         | 520678 | 2375912 |
| 3   | Point | 0  | مكة المكرمة | 584682 | 2367023 |
| 4   | Point | 0  | الليث       | 633749 | 2229717 |
| 5   | Point | 0  | القنفذ      | 718445 | 2116058 |
| 6   | Point | 0  | الطائف      | 647444 | 2352307 |
| 7   | Point | 0  | الحزم       | 813848 | 2424238 |
| 8   | Point | 0  | رينيه       | 899373 | 2353646 |
| 9   | Point | 0  | نربة        | 774649 | 2347863 |
| 10  | Point | 0  | الحوية      | 656986 | 2371213 |
| 11  | Point | 0  | القوز       | 742481 | 2098395 |
| 12  | Point | 0  | غمره        | 778963 | 2165992 |
| 13  | Point | 0  | مشوقه       | 795370 | 2141529 |
| 14  | Point | 0  | المنطليق    | 714263 | 2160103 |
| 15  | Point | 0  | حداد        | 712928 | 2278543 |
| 16  | Point | 0  | الشايب      | 668468 | 2345468 |
| 17  | Point | 0  | الحظيرة     | 863248 | 2532646 |
| 18  | Point | 0  | الصبور      | 706134 | 2309600 |
| 19  | Point | 0  | خليص        | 535686 | 2448096 |
| 20  | Point | 0  | الفرج       | 557782 | 2434485 |
| 21  | Point | 0  | الغفرة      | 558865 | 2401605 |
| 22  | Point | 0  | الجموم      | 572724 | 2392160 |
| 23  | Point | 0  | الاخيلة     | 603116 | 2395487 |

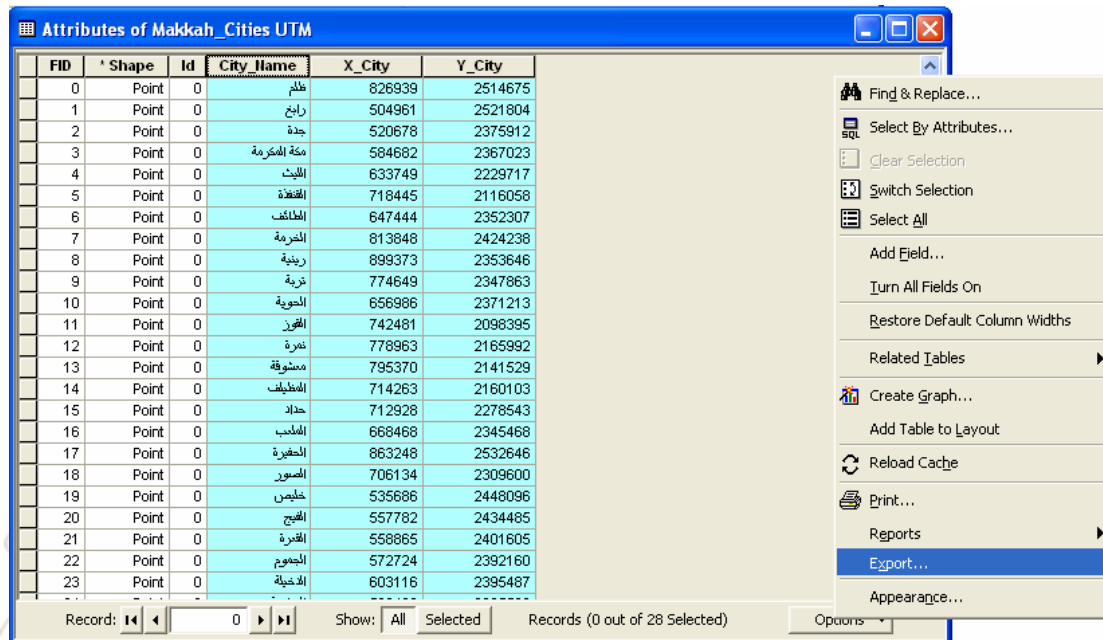
UTM

X, Y

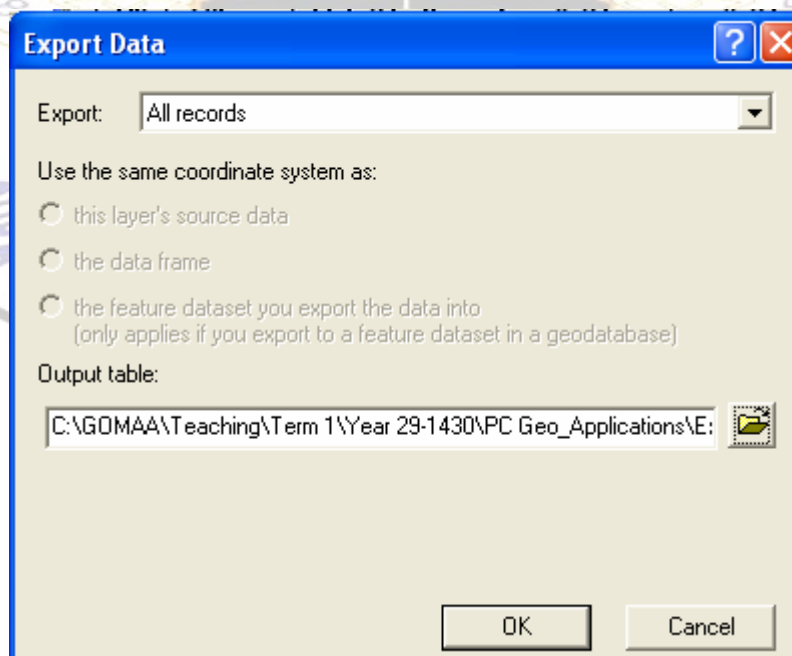
SPSS

: \_\_\_\_\_ X, Y

: Export " " Option

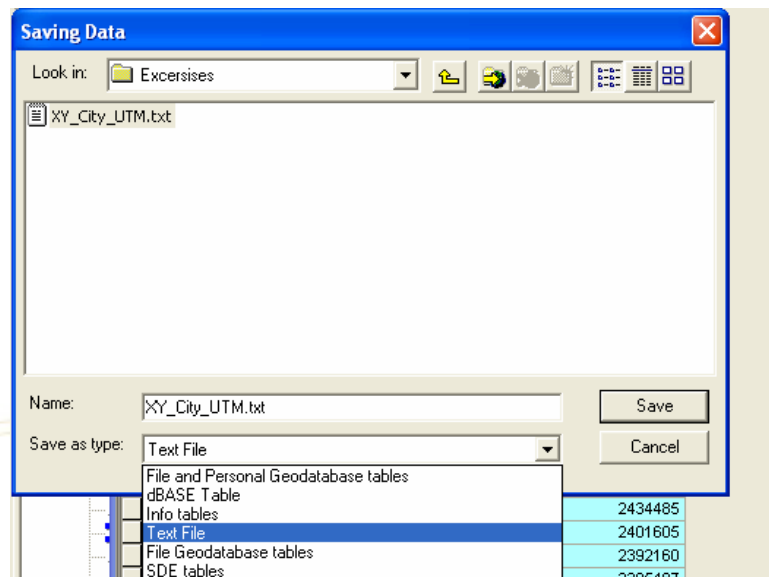


: Output table ( )

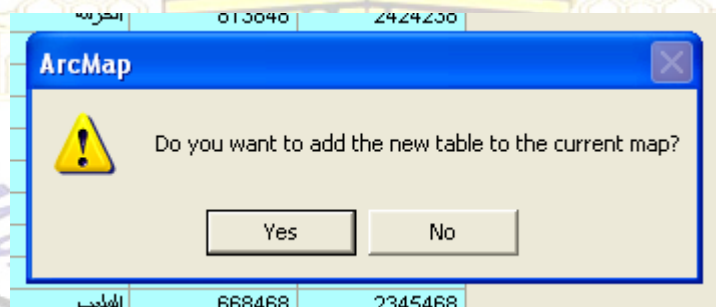


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:  
 Name  
 Arc GIS :  
 ( )  
 Text File  
 Excel :  
 Notepad



Arc GIS  
 : No Layout



XY\_City\_UTM - Notepad

File Edit Format View Help

```
"FID_" "Id" "City_Name" "X_City" "Y_City"
0,"826939",0,"ظلم",826939,2514675
0,"504961",0,"رابع",504961,2521804
0,"520678",0,"جدة",520678,2375912
0,"584682",0,"مكة المكرمة",584682,2367023
0,"633749",0,"اليث",633749,2229717
0,"718445",0,"الثقفة",718445,2116058
0,"647444",0,"الطائف",647444,2352307
0,"813848",0,"الخرمة",813848,2424238
0,"899373",0,"رينة",899373,2353646
0,"774649",0,"تربة",774649,2347863
0,"656986",0,"الحوية",656986,2371213
0,"742481",0,"الوز",742481,2098395
0,"778963",0,"نمرة",778963,2165992
0,"795370",0,"معشوقة",795370,2141529
0,"714263",0,"المظيلف",714263,2160103
0,"712928",0,"حداد",712928,2278543
0,"668468",0,"الملعب",668468,2345468
0,"863248",0,"الحفيرة",863248,2532646
0,"706134",0,"الصور",706134,2309600
0,"535686",0,"خليص",535686,2448096
```

اكتب سؤالاً للتعليمات

Arabic Transparent 12 B I U

|    | A    | B  | C           | D      | E       | F |
|----|------|----|-------------|--------|---------|---|
|    | FID_ | Id | City_Name   | X_City | Y_City  |   |
| 1  |      |    |             |        |         |   |
| 2  |      | 0  | ظلم         | 826939 | 2514675 |   |
| 3  |      | 0  | رابع        | 504961 | 2521804 |   |
| 4  |      | 0  | جدة         | 520678 | 2375912 |   |
| 5  |      | 0  | مكة المكرمة | 584682 | 2367023 |   |
| 6  |      | 0  | اليث        | 633749 | 2229717 |   |
| 7  |      | 0  | الثقفة      | 718445 | 2116058 |   |
| 8  |      | 0  | الطائف      | 647444 | 2352307 |   |
| 9  |      | 0  | الخرمة      | 813848 | 2424238 |   |
| 10 |      | 0  | رينة        | 899373 | 2353646 |   |
| 11 |      | 0  | تربة        | 774649 | 2347863 |   |
| 12 |      | 0  | الحوية      | 656986 | 2371213 |   |
| 13 |      | 0  | الوز        | 742481 | 2098395 |   |
| 14 |      | 0  | نمرة        | 778963 | 2165992 |   |
| 15 |      | 0  | معشوقة      | 795370 | 2141529 |   |
| 16 |      | 0  | المظيلف     | 714263 | 2160103 |   |
| 17 |      | 0  | حداد        | 712928 | 2278543 |   |
| 18 |      | 0  | الملعب      | 668468 | 2345468 |   |
| 19 |      | 0  | الحفيرة     | 863248 | 2532646 |   |
| 20 |      | 0  | الصور       | 706134 | 2309600 |   |
| 21 |      | 0  | خليص        | 535686 | 2448096 |   |

## : Arc GIS

|              | Pre-Logic BBA Script Code :  |   |
|--------------|--|---|
| dblArea      | Dim dblArea as double<br>Dim pArea as IArea<br>Set pArea = [shape]<br>dblArea = pArea.area                 |   |
| dblPerimeter | Dim dblPerimeter as double<br>Dim pCurve as ICurve<br>Set pCurve = [shape]<br>dblPerimeter = pCurve.Length |   |
| dblLength    | Dim dblLength as double<br>Dim pCurve as ICurve<br>Set pCurve = [shape]<br>dblLength = pCurve.Length       |   |
| dblX         | Dim dblX As Double<br>Dim pArea As IArea<br>Set pArea = [Shape]<br>dblX = pArea.Centroid.X                 | X |
| dblY         | Dim dblY As Double<br>Dim pArea As IArea<br>Set pArea = [Shape]<br>dblY = pArea.Centroid.Y                 | Y |



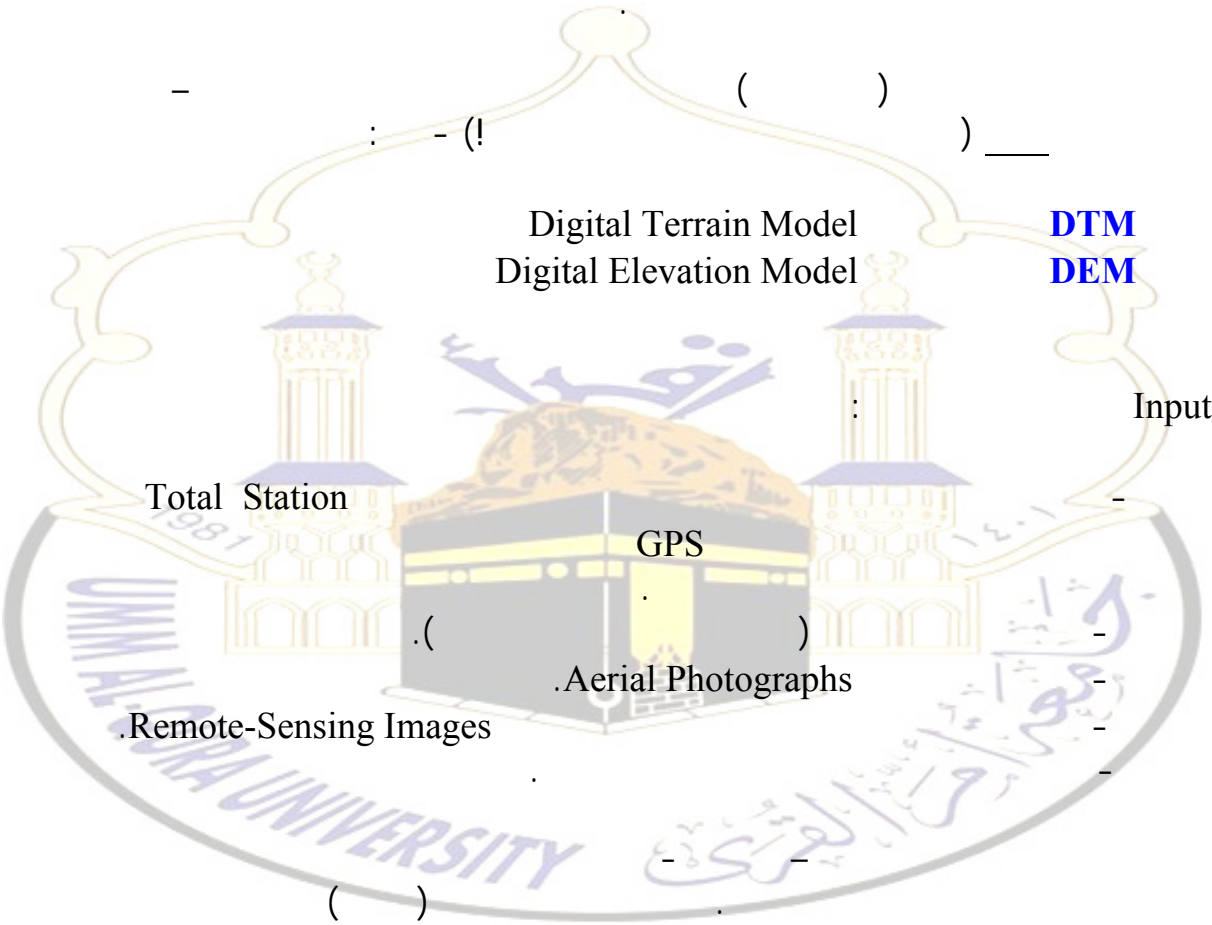
DTM ( )

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Raster Data ( )



SPOT

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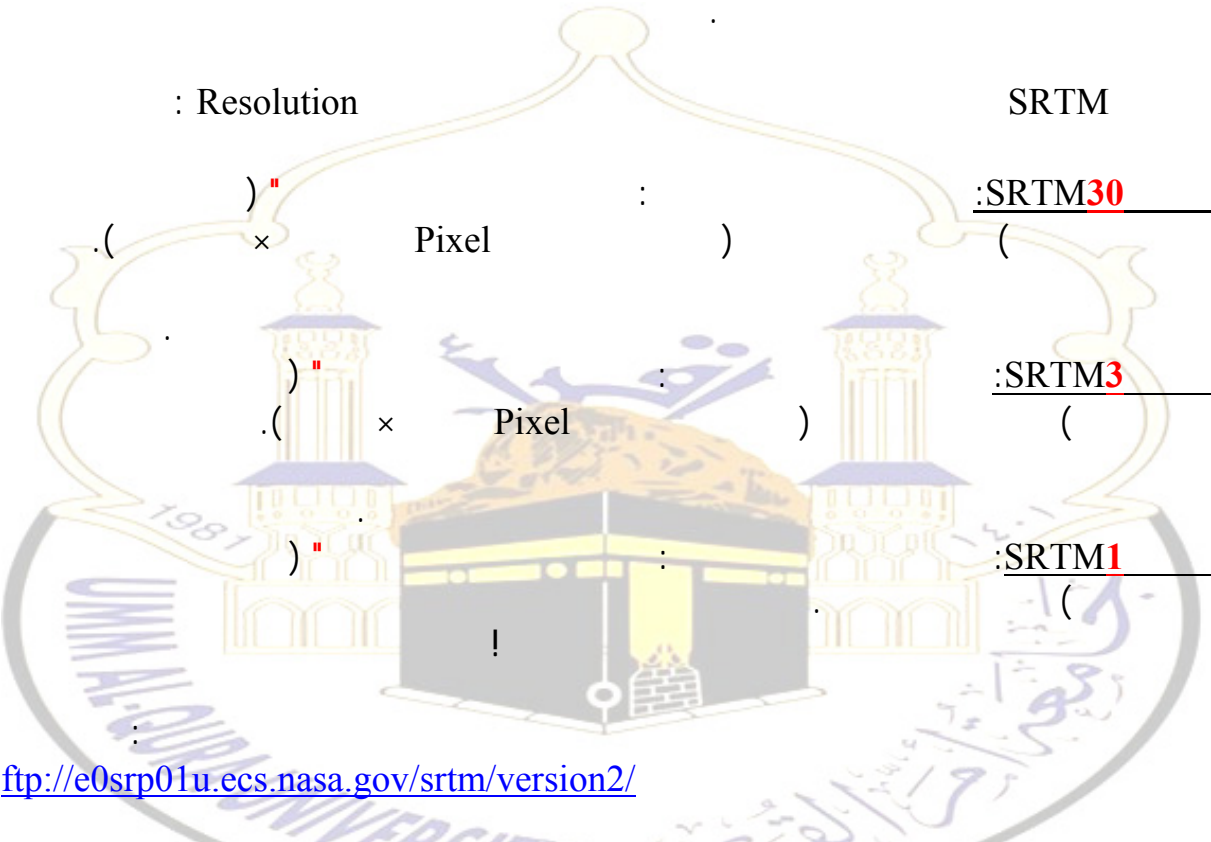
:  
 : GLOBE -  
<http://www.ngdc.noaa.gov/mgg/topo/globe.html>  
 : ETOPO2 -  
<http://www.ngdc.noaa.gov/mgg/fliers/06mgg01.html>  
 : ASTER -  
[/http://edcimswww.cr.usgs.gov/pub/imswelcome](http://edcimswww.cr.usgs.gov/pub/imswelcome)  
[/http://srtm.usgs.gov](http://srtm.usgs.gov) : SRTM -



**SRTM** ( )

" Endeavour "

Shuttle :  
Radar Topography Mission  
DTM - - .SRTM .SRTM



FTP Listing of /srtm/version2/ at e0srp01u.ecs.nasa.gov - Microsoft Internet Explorer

Address: <ftp://e0srp01u.ecs.nasa.gov/srtm/version2/>

**FTP Listing of /srtm/version2/ at e0srp01u.ecs.nasa.gov**

|                                  |   |
|----------------------------------|---|
| <a href="#">Parent Directory</a> |   |
| Sep 21 2005 00:00                | Directory <a href="#">Documentation</a> |
| Jun 10 2005 00:00                | 3820 <a href="#">NAVMac800Q3File</a>    |
| Apr 05 2006 00:00                | Directory <a href="#">SRTM1</a>         |
| Mar 27 2006 00:00                | Directory <a href="#">SRTM3</a>         |
| Apr 27 2006 00:00                | Directory <a href="#">SRTM30</a>        |
| Mar 27 2006 00:00                | Directory <a href="#">SWBD</a>          |

. SRTM30 SRTM3

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SRTM

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Vertical Accuracy

E020N40.hgt.zip

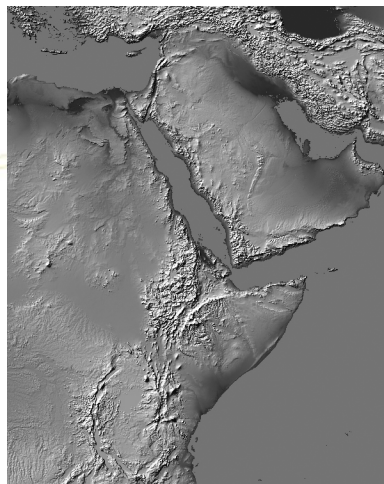
SRTM30

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(unzip  
Global Mapper  
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hgt

– Arc GIS

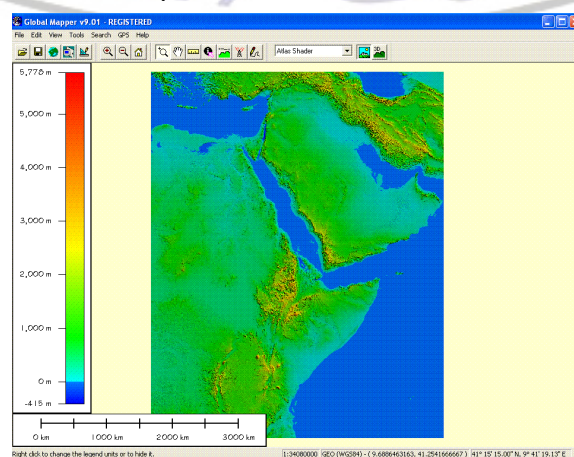
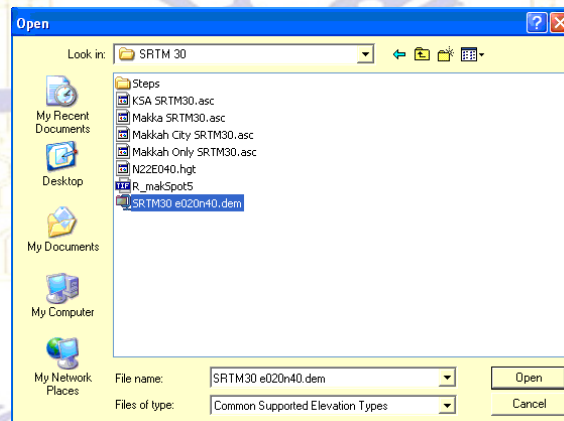
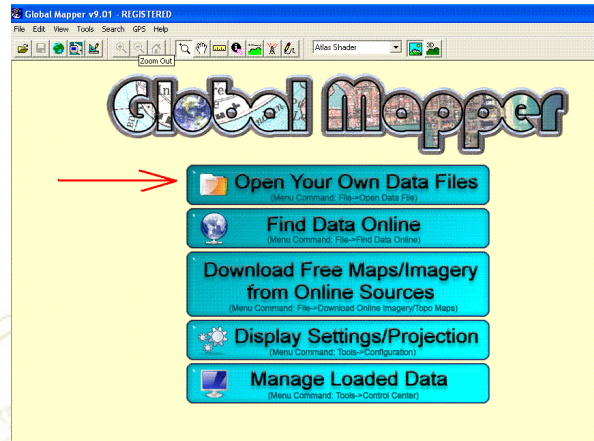
ESRI

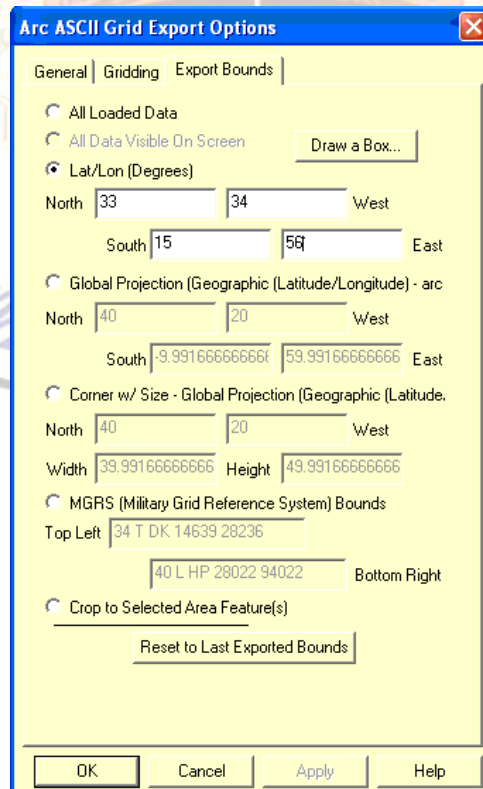
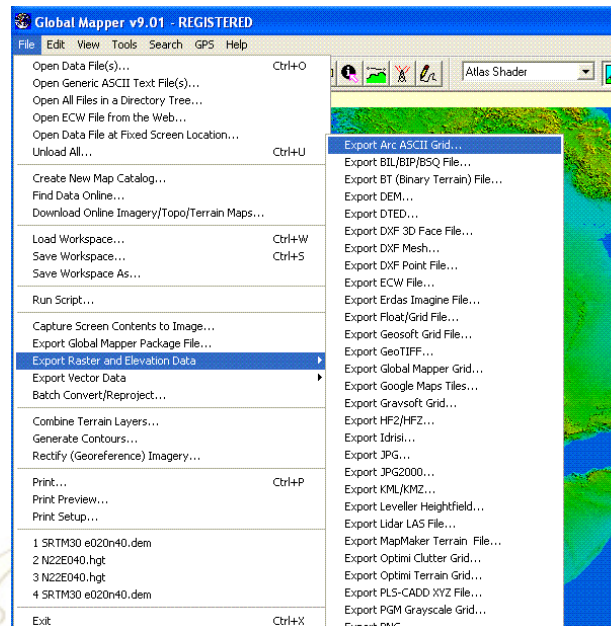
(zip

.Arc GIS

SRTM

:Arc GIS

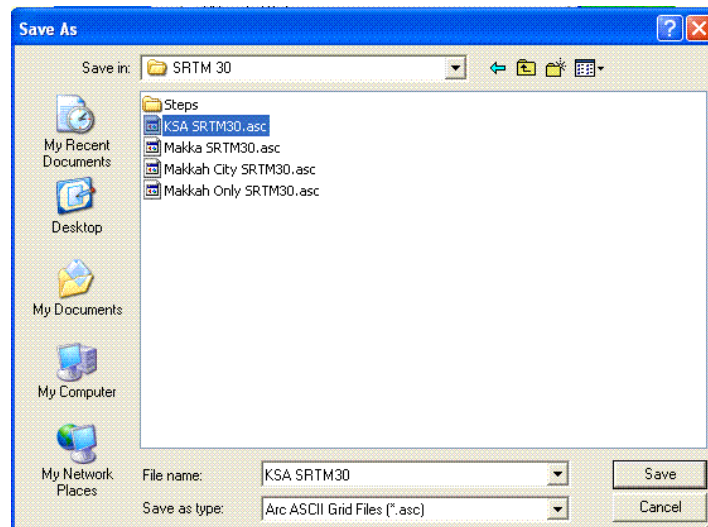






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KSA SRTM30 :



KSA SRTM30.ASC :  
ASC

KSA SRTM30.RAR )

KSA SRTM30.ASC  
.Global Mapper  
MAKKAH SRTM30.ASC

:Arc MAP

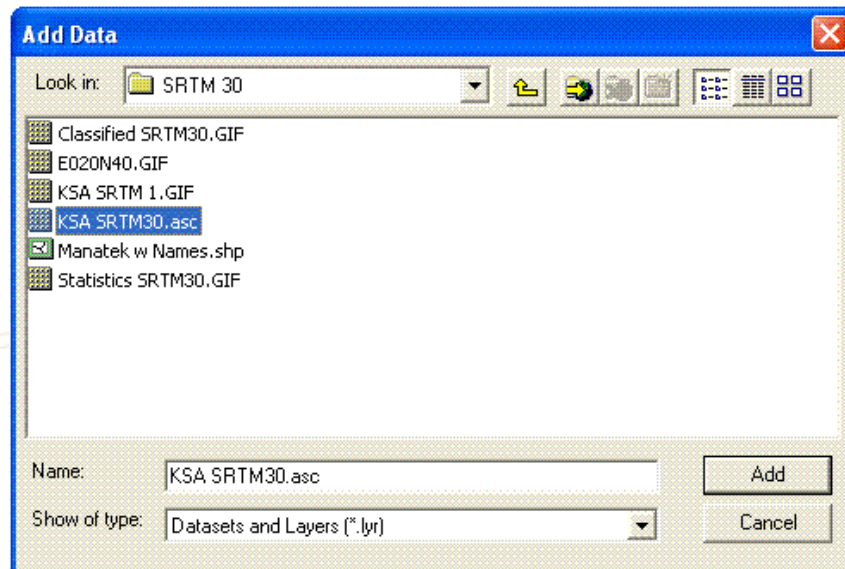
Add Data

Arc Map

KSA SRTM30.ASC

:

Arc Map



geo-referencing

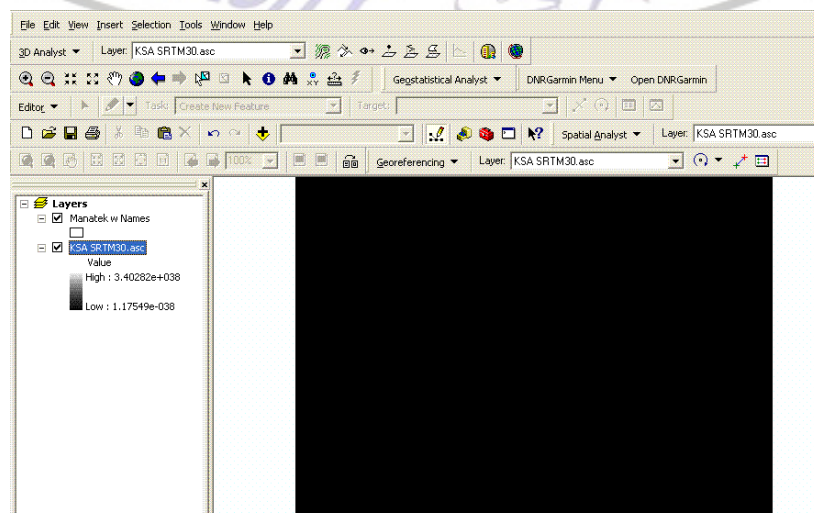
WGS1984

SRTM

Datum

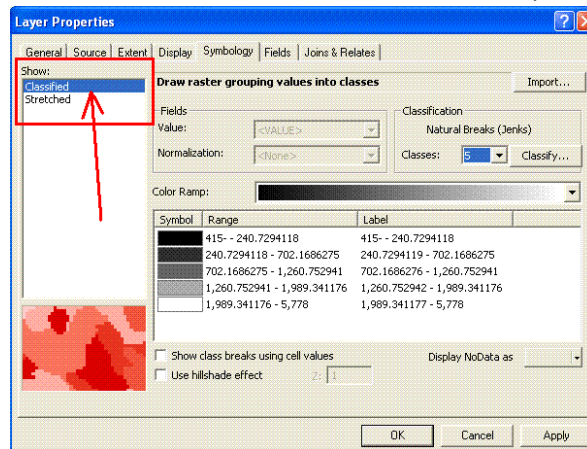
!!!!

Add

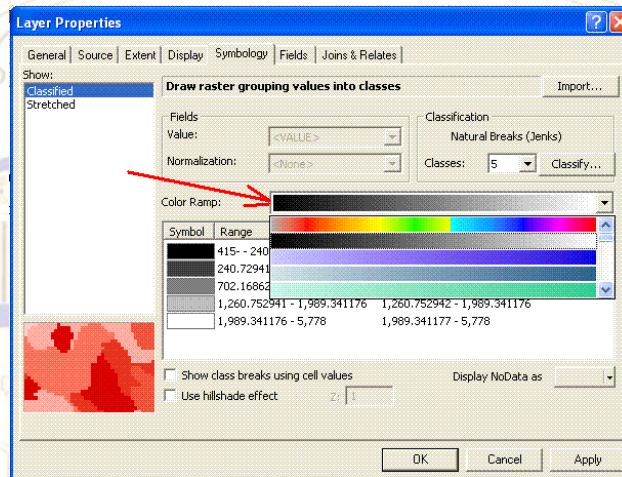




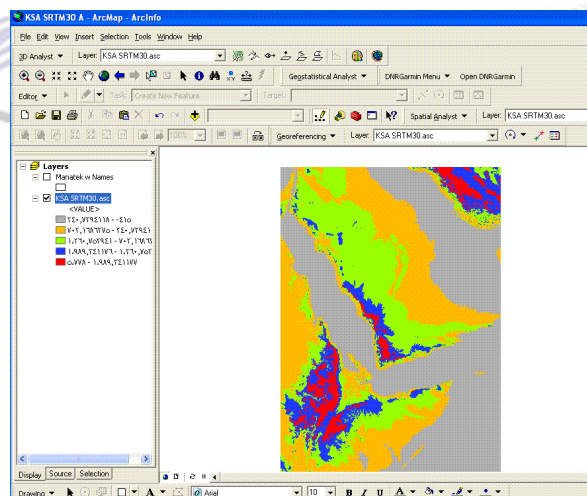
( double click ) properties  
 Classified ( ) Stretched



Color Ramp



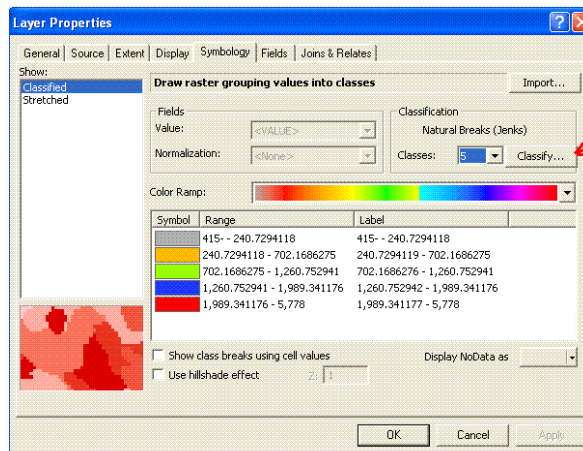
OK



properties

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Classify



count = 13627559

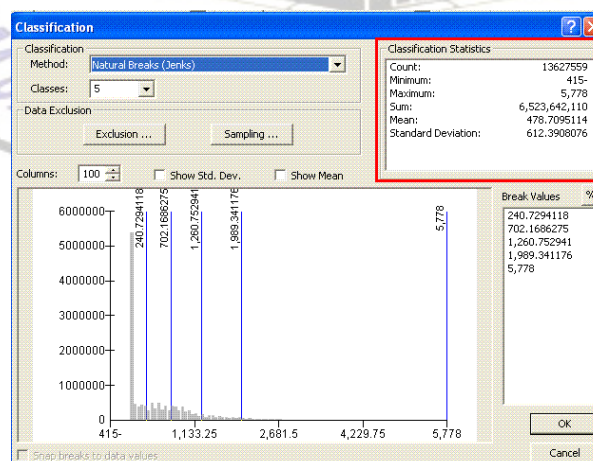
Minimum = -415

Maximum = 5778

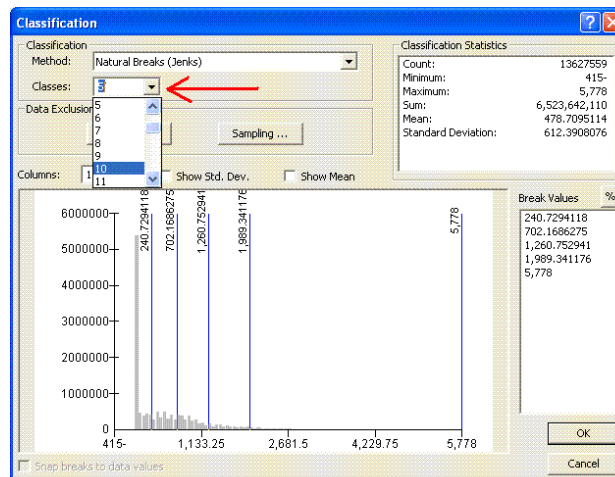
Sum = 6523642110

Mean = 478.7

Standard Deviation = 612.3

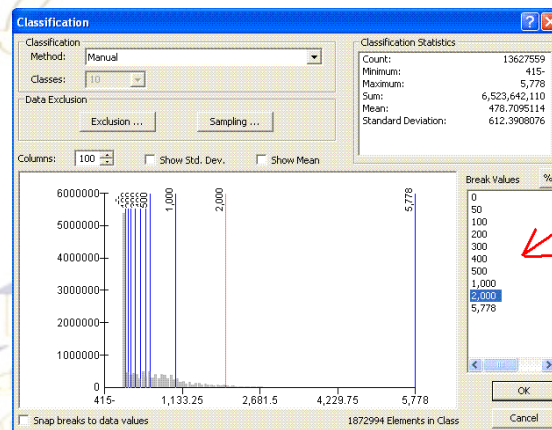


Classes

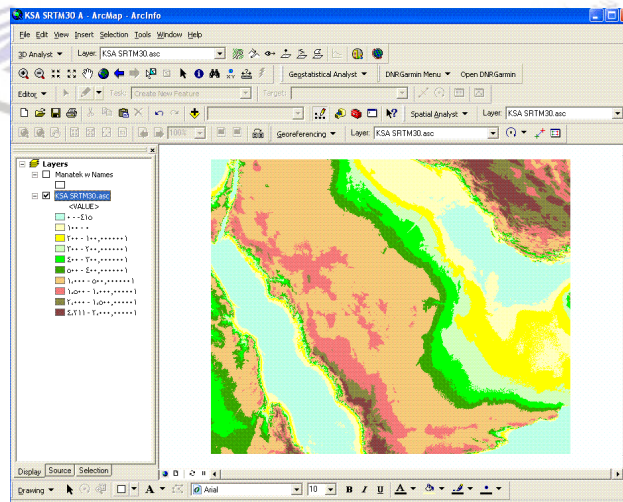


Natural Break Method  
Break Values

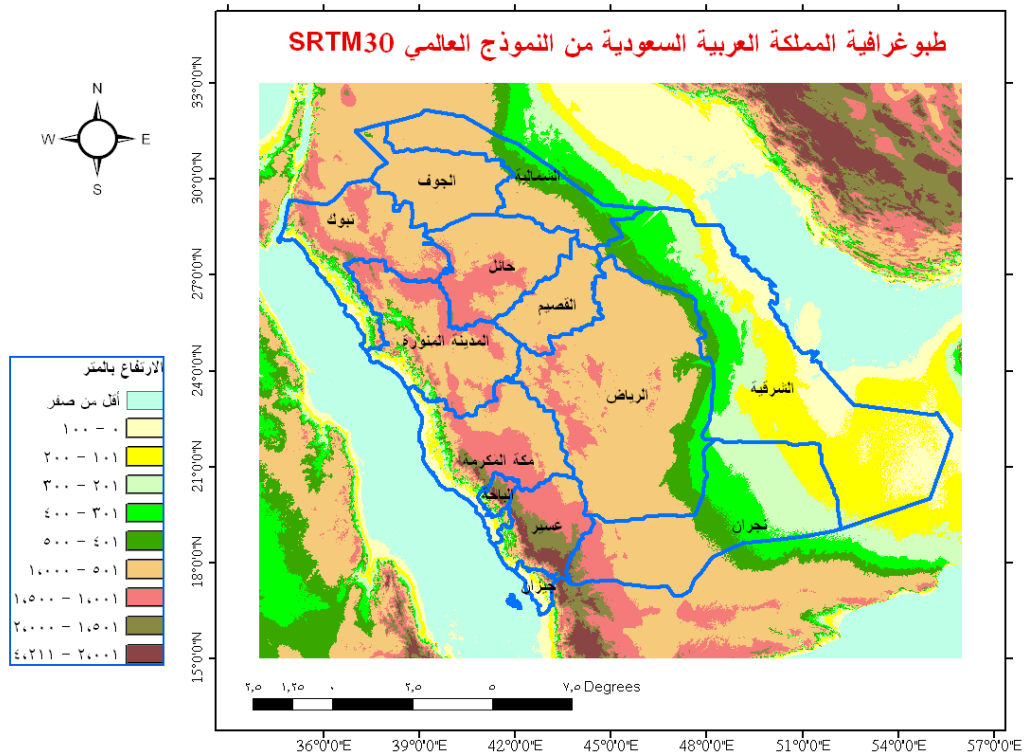
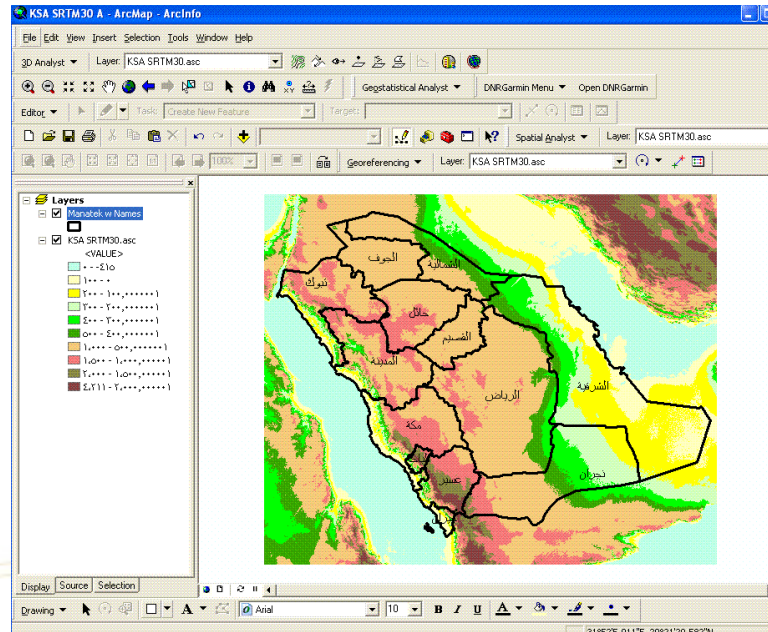
Manual



OK







Arc GIS

: Input ( )

Total Station

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.GPS

.Remote-Sensing Images

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Text Files

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.DTM

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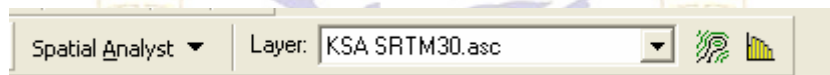
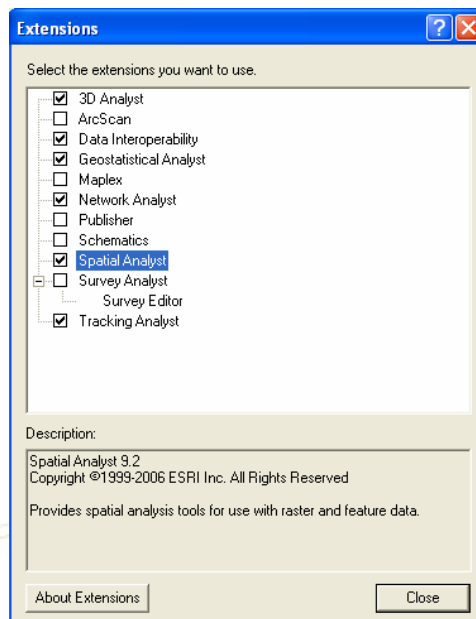
Extensions

Tools

:

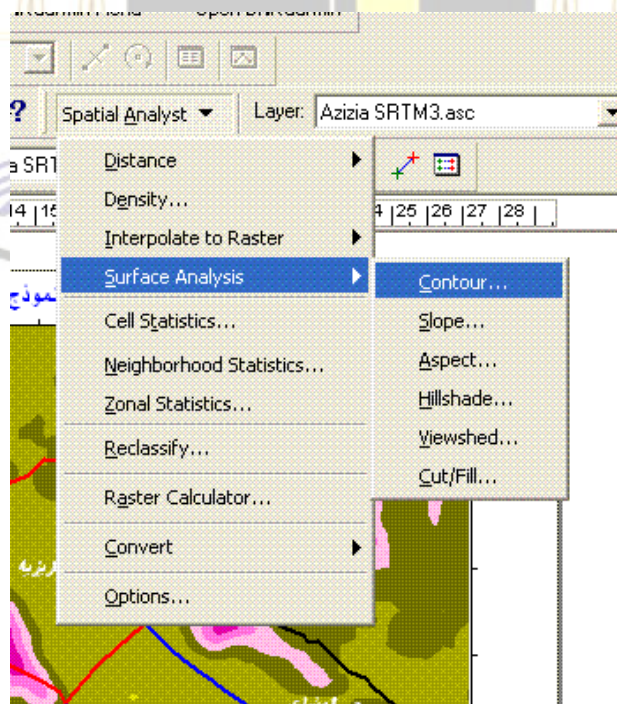


## Spatial Analyst



## Surface Analysis

:Contour



input surface :  
.KSA SRTM30.ASC

=  
= Contour Interval  
.)

**Contour**

Input surface: KSA SRTM30.asc

Contour definition

Input height range: Z min: 415- Zmax: 4211

Contour interval: 100

Base contour: 0

Z factor: 1

Output information based on input contour definition

Minimum contour: 400-

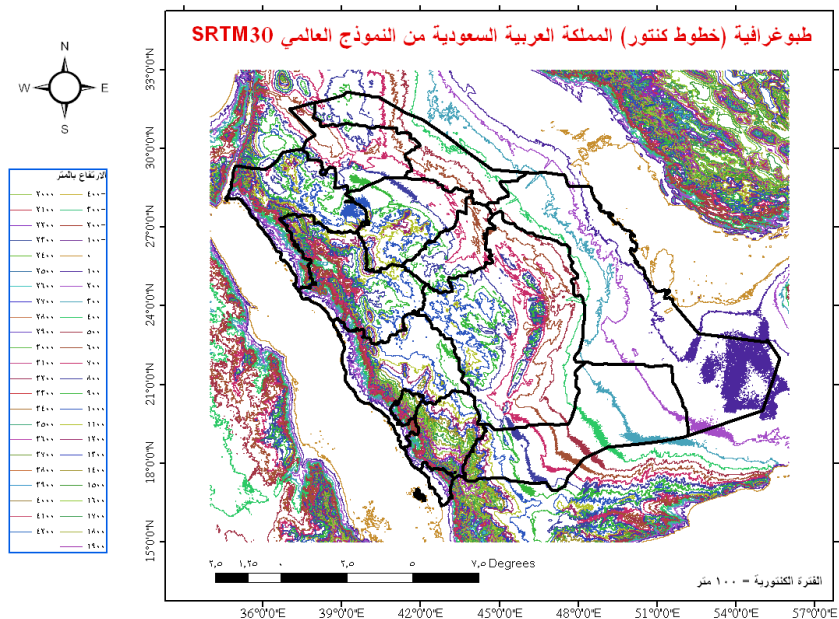
Maximum contour: 4200

Total number of contour values: 47

Output features: C:\Documents and Settings\Ac

OK Cancel

OK



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: Arc GIS

- Flow direction map -
- Flow accumulation map -
- Stream channels map -
- Strahler ordering method -
- Basins map -





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<http://www.gisclub.org/library/research/rs/0004.pdf> :

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<http://www.gisclub.org/library/research/gis/dams.zip>:

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SRTM

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<http://www.gisclub.org/library/DEM3D.pdf>:

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<http://www.sru-> :

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[/diyala.com](http://www.diyala.com)

<http://cid-0259cb4f889eae3.skydrive.live.com/self.aspx/Arabic%20Surveying%20Materials/Statistics%20in%20Geography%20Ar.pdf>

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<http://www.gisclub.org/library/research/Survey/0001.rar>:

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ArcMap

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[http://cid-0259cb4f889eae3.skydrive.live.com/self.aspx/Arabic%20Surveying%20Materials/ArcMap%20Tutorial\\_Ar%20Gomaa%20Dawod.pdf](http://cid-0259cb4f889eae3.skydrive.live.com/self.aspx/Arabic%20Surveying%20Materials/ArcMap%20Tutorial_Ar%20Gomaa%20Dawod.pdf)

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ArcToolBox

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– Arc GIS 9

– ESRI

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<http://www.gisclub.org/library/GISDEM.pdf> :

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<http://www.gisclub.net/vb/>

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<http://www.gisclub.net/vb/showthread.php?t=2585>

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Standards in Surveying:  
Geodesy and GPS

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<http://surveying.ahlamontada.com/montada-f7/topic-t167.htm#267>

